

PRINTING THEORY AND PRACTICE

23

Edition Case Binding

MASON

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AUTHOR'S NOTE

EDITION case binding is the mass production section of the bookbinding trade. From *folding* to *casing-in*, the books travel through a sequence of operations, each performed by a machine and all at high speed. So in this section of the trade the binder has become an operator of a machine which is but a unit of the whole. Nevertheless, he must have considerable skill to obtain good results from his machine. He must know why he does his work and where it fits in to the complete process.

In one large edition bindery I found the operator of a Crawley Rounder and Backer who was very proud of his machine, but had no idea why books were rounded and backed. I saw piles of cased-in books clamped into hydraulic presses, but the first and second linings came clean away from the backs. Nobody seemed to be concerned. Go to the local college and bind a book right through by hand; you will enjoy it and understand your own job better.

Only the endpaper and mull lining hold a cased book to its cover. The plant that first introduces a sewn-on reinforced endpaper will be a pioneer towards sounder methods.

JOHN MASON.

LEICESTER.

Edition Case Binding

CHAPTER I

FOLDING AND GATHERING

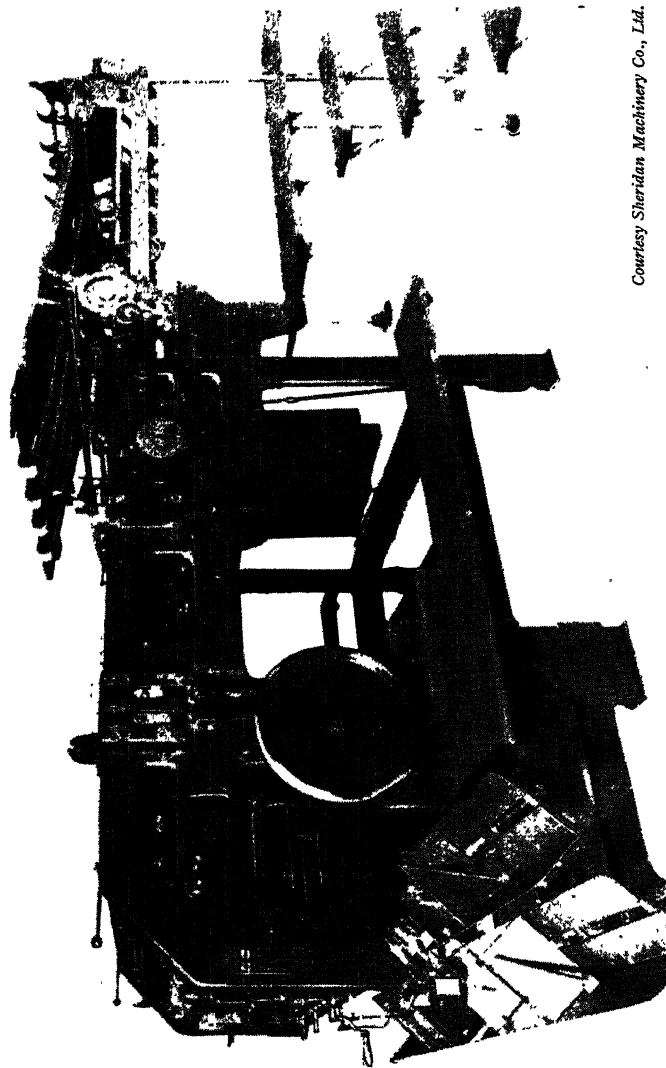
BEFORE 1730, booksellers issued most books in sheep or calf bindings. After this date, however, it became customary to issue books in plain paper wrappers and with uncut edges. The buyer could then have the books bound in any style he pleased, as is still the custom in France.

At the beginning of the nineteenth century, paper wrappers began to be replaced by paper-covered boards, which afforded greater protection to the books. Title labels were pasted to the backs, and the books could remain on the shelves until it was convenient to have them re-bound.

As the book-buying public increased, publishers issued many books that were not worth binding in leather. It became necessary to find a cheaper covering material, and about 1824 the first bookbinding cloth appeared. These cloth bindings had paper title labels, and the boards were laced to the book as in leather binding.

Gradually, machines were introduced to speed up edition binding. Wilson's guillotine was brought out in 1851, the Sheridan Casemaker in 1879, the Dexter Folder with automatic feed in 1898, and the Crawley Rounder and Backer about 1900.

The first cloth cover blocked in gold was produced in 1832, and from that time to the present day most books published in this country have been issued in blocked case bindings. The different periods have been marked by various styles of decoration, and a simple and restrained treatment is characteristic to-day. Much bookbinders' cloth is embossed to imitate various leather grains, but that with a natural finish is becoming more popular. Publishers' edition binding, an increasingly important section of the

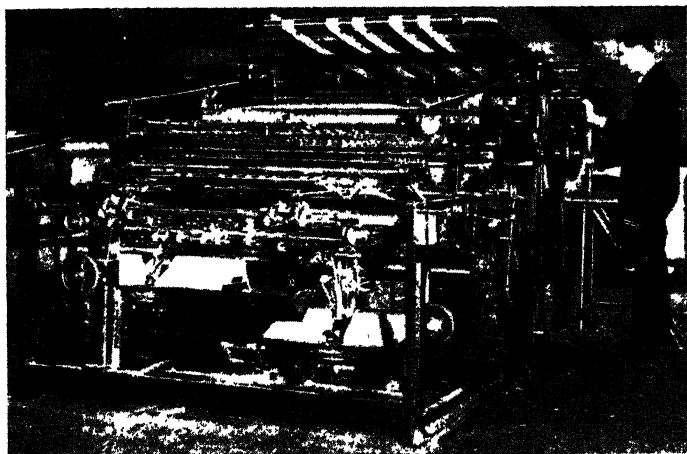


Courtesy Sheridan Machinery Co., Ltd.

FIG. 1. "DEXTER" QUADRUPLE FOLDER.

bookbinding industry, is now done almost entirely by machinery.

FOLDING MACHINES. There are many reliable folding machines, and they are made to take all the standard sizes of paper. The printer must always impose his pages to suit the folding machine used, and he must also know which are the lay edges. Most folding machines work on the knife



Courtesy Smyth-Horne, Ltd.

FIG. 2. "CHAMBERS" QUADRUPLE FOLDING MACHINE.

principle. A dull-edged blade descends on the sheet where the fold is to be made and presses it between two rotating rollers, which draw it between them to make the first fold. After leaving the first rollers, the sheet is carried by travelling tapes to a second set, where the next fold is made. This process is repeated until the folding is complete, the folded section being finally delivered into a trough. Most machines are provided with perforators to prevent creasing at the folds and with slitters for multiple work.

Quadruple 16-page machines, such as the "Dexter" (Fig. 1) and the "Chambers" (Fig. 2), fold and slit a 64-page

sheet and deliver it as four 16-page sections, or they insert and deliver as two 32-page sections. When fitted with automatic feeders, these machines have a maximum speed of 12,000 16-page or 6,000 32-page sections an hour. The double 16-page folders take a 32-page sheet and deliver as two 16-page sections or insert and deliver as one 32-page.

In the "Brehmer" Folding Machines (Fig. 3) the tapes are carried on separate rollers quite independently of the

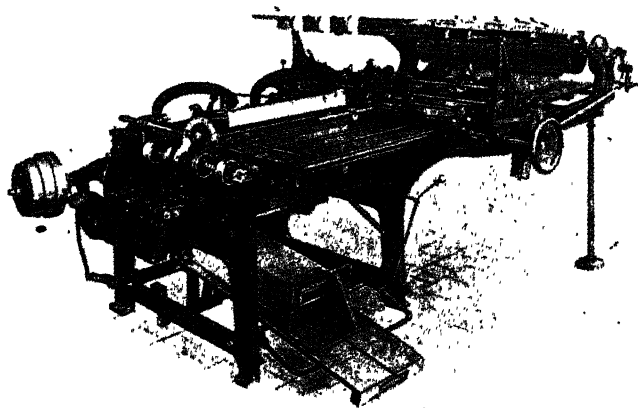


FIG. 3. "BREHMER" FOLDING MACHINE
with automatic continuous feeder.

folding rollers, and are kept at the same tension by means of weights. When the tapes stretch, the weights automatically rectify the tape tension. Where freshly printed work is to be folded, the machines are supplied with rubbered rollers for the first and second folds so that continual cleaning is not necessary.

Some models of the "Friedheim" Folding Machine are fitted with patent vertical knife guides which reduce the rise and fall of the knives to a minimum, and so prevent the vibration frequently experienced with ordinary knife arms

when running at high speeds. When fitted with automatic feeders, these machines are capable of folding 5,000 full-size sheets an hour.

In Buckle Folding Machines no tapes, knives, or cams are used. The sheet travels between a pair of folding rollers, and enters into a fold plate until it reaches a stop which can be set in any position, according to the size of the paper. On striking the stop, the sheet forms a fold or buckle close to the lip of the plate in between the rollers by which it is still being driven. The folded sheet is then drawn away by a third roller, which acts in conjunction with the lower roller of the pair.

This system of folding is accurate, and allows for a compact combination of a number of folds parallel to one another. It also enlarges the range of folds which the machine can make. With the rotary buckle-folding system, the machine is independent to any timing and will fold as fast as an operator or an automatic feeder can feed it. From the point of view of output, on this type of machine, the smaller the size of the sheets, the greater the number of sheets to the hour that can be folded. When equipped for hand feeding, these machines are provided with a feed table composed of a series of diagonally placed rollers. The feeder drops the sheets one by one on the table, which automatically carries them into the machine and at the same time brings them accurately to the side guide. The machines can also be equipped with automatic feeders, which feed a continuous stream of sheets whatever their size.

"Cleveland" folders (Fig. 4) are built in different sizes and are considered universal, as there is scarcely any fold likely to come into a bindery which they will not handle. In addition to all the standard parallel and cross folds that are necessary, the machines handle a very wide variety of unusual folds which formerly had to be made by hand. They are, therefore, suitable, not only for book and catalogue work, but also for general jobbing, folding of the

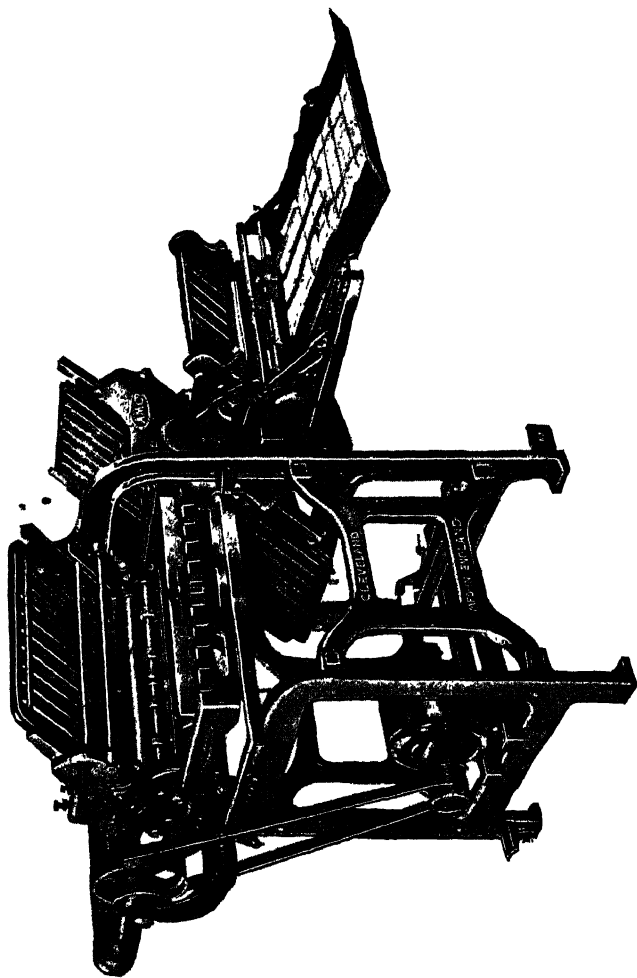


FIG. 4. "CLEVELAND" FOLDING MACHINE, MODEL R.

popular broadsides, and other advertisers' printing which forms a large proportion of the work in many binderies.

Automatic Feeders. Automatic feeders fitted to folding machines are of two types: pile and continuous. In the suction type of pile feeder, rubber suckers lift and carry the top sheet to the machine. In the comber type, the combing wheel runs out the sheets until they reach the guide, when a rubber roller feeds them into the machine. The continuous feeders are usually of the combing-wheel

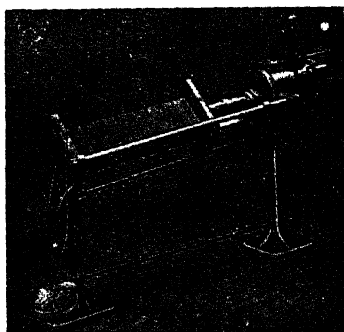


FIG. 5. "BERRY" AIR BUNDLER.

type. They are replenished simply by placing more sheets on the feed board, and this in no way interferes with the continuous running of the machine.

BUNDLING. To make the sections solid after folding, they are tightly compressed in a bundling or signature press. This pressing removes the air from between the leaves, allows the sections to lie flat, and facilitates the gathering and subsequent processes. The folded sheets are placed in a V-shaped trough and tightly squeezed between two heavy metal heads, of which sometimes one and sometimes both work along the trough. Automatic power-driven presses and the increasingly popular pneumatic presses are used in large binderies, and hand-operated machines are used for smaller

quantities of work. By means of holes or slots in the heads, string can be passed round the sections while under pressure; they can then be tied into bundles between boards, and stored flat and clean until required. With some classes of paper, the pressure applied in the bundling-press is sufficient without further smashing or nipping after sewing. Fig. 5 shows a "Berry" air bundler.

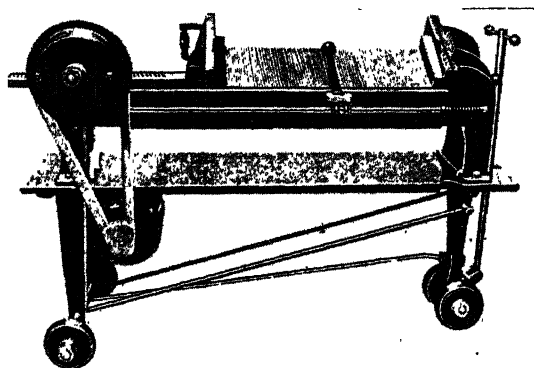


FIG. 6. "MURRAY" PORTABLE BUNDLING PRESS.

Portable bundling presses may be moved to the most convenient position for compressing and tying up the folded sheets as they are delivered from the folding machine. In the "Murray" press (Fig. 6) the motor is suspended under the table. The power is transmitted from a pinion on the motor shaft by a chain to the gear-box which contains an epicyclic gear train. This gear train reduces the high speed of the motor to the slow, powerful, compressing movement required by the movable head of the press. Thus, although the motor is very small, the force transmitted by the gear ratio is considerable. The motor starts automatically when the operator pulls forward the movable head by the handle against the end of the loose bundle. This movement simultaneously engages the gear train, and when the bundle is

compressed to the pressure for which the machine has been adjusted, the motor stops automatically, so promptly and definitely that every bundle receives the same pressure. This uniformity of pressure ensures uniformity of thickness when the sheets have been gathered into books.

When the motor stops, the pressure is maintained by the gear train until the bundle has been tied, when the operator, by a movement of the lever, disengages the gear train. The movable head then retires, the fully compressed bundle is free for removal, and the press is ready for the reception of another charge of loose, folded sheets. The motor can be connected with the lighting system by an adaptor, so that the press can be moved easily, and the usual carrying of the folded sheets to a fixed bundling press is not necessary.

Plates. Bolts must be slit with a sharp knife or a folder where single plates have to be tipped within sections. The bolts of such sections may be trimmed off in the guillotine, but as this spoils the uniformity of the margins it should not be done on good work. Experienced girls will tip from 400 to 500 plates an hour, according to the size.

Maps. Blank leaves perforated at $\frac{1}{2}$ inch from the back should be bound up wherever folded maps or plans are to be inserted. When the binding is complete, these leaves can be torn out, the backs forming guards for the maps, which can then be tipped into position. Another method is to sew in guards, using loose waste sheets to fill the spaces which the maps eventually take. Either method enables the books to be kept solid throughout the binding processes, and prevents any danger of "bleeding" the maps when the edges are cut.

Endpapers. Publishers' case bindings usually have single endpapers of white, coloured or printed pattern-paper, tipped to the outsides of the first and last sections before sewing. Endpapers should not be too heavy, or they will drag the first and last leaves.

The "Marresford" Endpapering and Plate-pasting Machine (Fig. 7) is the only fully automatic machine of its kind. The

end sections and the endpapers are placed in two horizontal hoppers, which are fitted at the top of the machine in any easy position for a girl to keep them replenished. An end section and an endpaper are automatically dislodged by

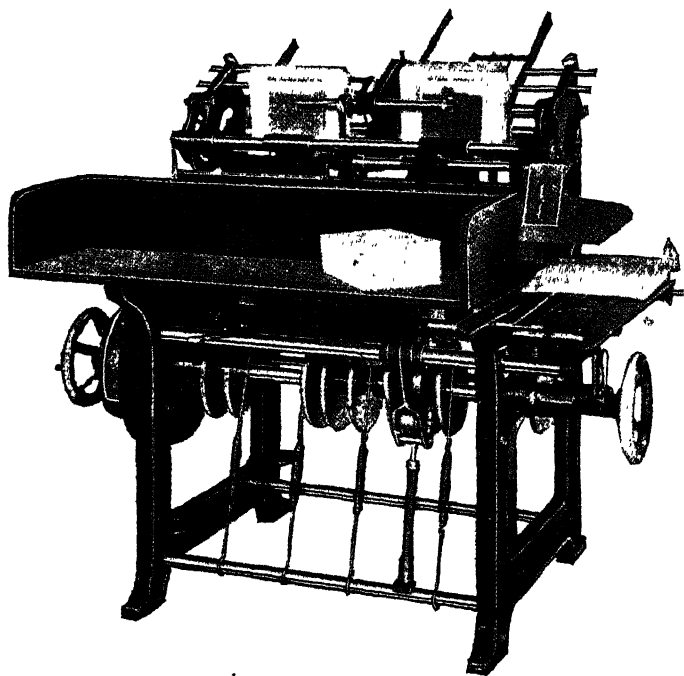


FIG. 7. "MARRESFORD" AUTOMATIC TIPPING MACHINE.

means of a suction pull, and a uniform strip of paste is conveyed to the endpaper by a paste bar. Endpaper and section are then brought together, registered, pressed, and finally projected on to a table, and stacked to ensure that the pasting is not disturbed. When the machine does not function properly, the operator is warned by the work being projected in a forward position. The change-over from one size of job

to another can be done in a few minutes by the girl operator. Ordinary bookbinder's paste can be used, the machine operating at about 3,000 tips an hour.

The "Brehmer" Semi-automatic End-sheet Pasting Machine (Fig. 8) is very popular in this country and, though it is hand-fed, is capable of an output of 2,000 pastings an hour. A great advantage is its compactness, a floor space of 3 feet by 4 feet being all that is required. In this machine the end-

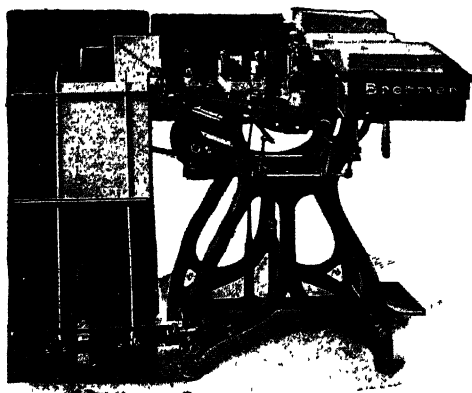


FIG. 8. "BREHMER" END-SHEET PASTING MACHINE.

papers and sections are fed into two flaps which fold towards each other. One endpaper or plate and one section are caught up by a pair of vertical rollers and sent forward so that the inner back-edge of one comes into contact with the edge of a wheel revolving in a tank of gum. The other endpaper passes the wheel on the other side without touching it. Both then pass through another pair of rollers which press the back folds of the two sections together, and a further pair of rollers deliver the endpapered or plated section on to an automatically descending delivery table. The width of the gum strip can be regulated by the turn of a screw, and the machine can be set so that maps and illustrations are tipped flush with, or at a distance from, the head and back edge.

The larger model "Brehmer" pasting-machine also turns and pastes the endpaper or plate *round* the back of the section so that it can be sewn through the back with the rest of the section and add to the strength of the book. The small wheel which applies the gum is mounted obliquely and does not gum quite to the back edge of the sheet. This device prevents any gum from oozing out at the back when the sheets are nipped, and ensures perfectly clean work.

GATHERING. Gathering is still done by hand except on long runs. Experienced girls are able to maintain a speed of as high as 2,500 sections an hour, so that it is not worth gathering an edition of 5,000 or less by machine.

In machine gathering, piles of the various sections are placed in boxes or hoppers in consecutive order. The bottom section in each pile is pulled down by means of suckers so that a gripper-arm may seize it. The open jaws of the gripper close upon the section, draw it from beneath the pile and, moving backwards, carry it above a moving band. The jaws then open and drop the section, which is then carried along until it is brought below the next box, when another gripper drops the next section upon it. In this way the moving band travels the length of the machine, receiving one section from each box and finally delivering, in each pile of sections, a completely gathered book.

The space between the bottom of each hopper and its restraining bar is accurately set to the bulk of the particular section, so that it is impossible for more than one section to be removed at a time. If the jaws of the gripper-arm fail to remove a section, or if the bulk of a section shows it to be imperfect, a mercury-controlled cut-out device, which is very finely adjusted, immediately causes a "short" and stops the machine. At the same time, a lever with an indicator ball rises at the box where the trouble has arisen. It is then but a few seconds' work to remove the faulty section, pull down the lever, and restart the machine.

To facilitate separation, the sections in the boxes are

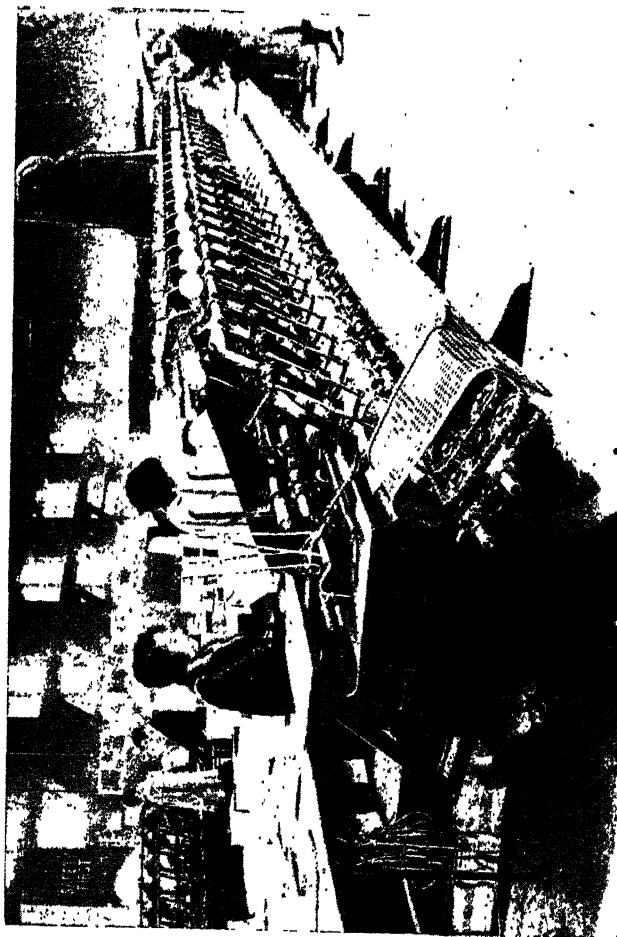


FIG. 9. "JUENGST" SECTION-GATHERING MACHINE.

supported in an arched position. In the "Sheridan" Gatherer they rest partly upon frictionless rollers which lie parallel with the suckers, and pile lifts also are supplied to each box. In the "Juengst" machine (Fig. 9) small hooks on each side of the gripper raise the pile at the moment of withdrawal to lessen the friction on the section which is being removed. The makers of these machines claim that they gather from 4,000 to 5,000 books an hour, and they can be supplied with from ten to sixty boxes. For magazine work they can be combined with wire-stitching and paper-covering units.

COLLATING. The gathered books are collated by hand at about 2,000 sections an hour. When stepped collation marks have been printed in the back folds, a glance is all that is necessary to discover any displacement of the sections. Collation is usually dispensed with when books have been machine-gathered, as errors are extremely rare.

CHAPTER 2

SEWING

THERE are several reliable makes of book-sewing machines made in different sizes and suitable for all classes of letterpress and stationery work. The sewing, which may be two-sheets-on or all-along, can be plain or through mull, round or through tapes, or round cords; it can also be a combination of any of these methods. The great advantages of machine-sewing are that it is from five to six times quicker than hand work, the tension of the thread is constant and adjustable, and each stitch is independent of any other. Every stitch in a machine-sewn book must be broken before the section can be removed, but in hand-sewn work one break in the thread is sufficient for the removal of the section. The kettle-stitch made in hand-sewing, however, is probably stronger than any machine-made stitch.

The sections are placed one by one upon the feed arm or saddle. The piercers, which are arranged in line with the needles, pierce the section from the inside by moving upwards through the back fold, leaving the burr of the paper outside on the back of the section. The section is then carried below the threaded needles, which descend into the holes already made and stitch it to the previous sections. The type of stitch varies with the make of machine used. When one complete book is sewn, a block is placed between it and the next book to give the required length of side tape. A device which loops the tapes for this purpose is fitted to many machines, so that spacer blocks are unnecessary. The books are finally separated simply by cutting the threads and tapes which join them together. The first and last sections of all books should be tipped along the inside back-edge before being sewn. Most machines are equipped with a small self-contained pasting apparatus through which the

sections are pulled by hand to receive a narrow strip of paste.

The "Brehmer" Sewing Machines are built in seven different models to suit various classes of work, but the fundamental principles are the same in all. Straight needles are standard, and an output of seventy to eighty sections a minute is obtained on the fastest models. A row of evenly-

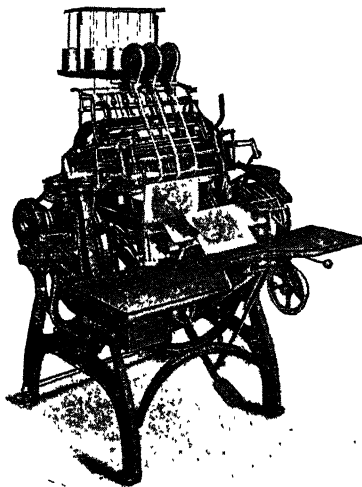


FIG. 10. "BREHMER" NO. 38½ BOOK-SEWING MACHINE.

placed sewing and hook needles enters the section at the holes made by the piercers when the saddle is in the highest position. At this point the needles recede slightly in order to form loops which are caught by slides and carried right across the open hooks of the hook needles. The hook needles then withdraw and carry the loops to the outside of the section and through the loops made in the preceding section. In this way the sections are fastened together by a series of chain or tambour stitches. The sewing needles can move sideways after each stitch to fasten the tapes or mull. The "Brehmer" No. 38½ (Fig. 10) is a letterpress sewing machine

with adjustable and detachable needle bodies. Besides sewing through or over tapes and through mull, it will also do the ordinary plain or French sewing. The tapes are secured by a continuous thread which crosses over them by means of the backward and forward motion of the sewing needles. To give the book additional strength, a head stitch is incorporated, so that a double thread can be inserted in the head of the section. Each completed book is tied off simply

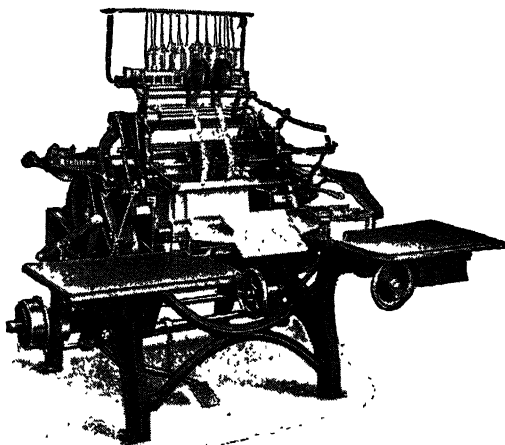


FIG. 11. "BREHMER" NO. 33 BOOK-SEWING MACHINE.

by the machine operating one saddle movement without a section on the saddle and making an extra blind stitch. Two books of suitable size may be sewn at the same time side by side on the larger size of this model, on which the output can be very high.

Model No. 38 is similar to Model No. 38½, but it is specially intended for sewing very thin sections, such as those used in Bibles, hymnals, and prayer books. It uses what is known as the *staggered* method of sewing—that is, the stitches are differently placed in each successive section, thus reducing back swell to a minimum. Undue swelling is prevented even

in books printed on India paper. Both models can also be supplied with an automatic attachment for cutting the end stitches of French-sewn books. Another automatic attachment can be obtained for cutting out books sewn on tapes or mull when spacer blocks are used in between; an automatic flyer grips the block and returns it to the front of the operator for use on the next book.

The "Brehmer" No. 33 Model (Fig. 11), which is specially built for sewing heavy account books, is the largest book-sewing machine made. It will sew books up to a maximum of 28 inches by 15 $\frac{3}{4}$ inches at the rate of forty sections a minute, with from two to twelve stitches. This style of sewing is different from that of the letterpress machines and is much stronger, because the stitches are formed so that they cross the tapes and secure them with a double stitch instead of with a single alternating stitch. For this method of stitching, the sewing needles are made to cross over each sewing operation by means of needle bodies, each of which contains two spindles that revolve vertically backwards and forwards. Stout linen thread can be used on this machine.

The "Brehmer" Fully Automatic has automatic laying-on of the sections, and also automatically pastes the first and last sections, loosens the tapes, and cuts the end thread. A cut-out device is incorporated, so that if a thread breaks the whole machine ceases to function. All these devices considerably reduce the cost of production, because one operator can attend to two machines and see to the loading of the feeders and the removal of the sewn work of both.

The "Smyth" Book-sewing Machines are made in seven models, and are of both straight- and curved-needle types, some having a single feed-arm, and others four. The four radial feed-arms project from a perpendicular rod, and each has a gauge to which the operator lays the sections. At each quarter turn a section is brought beneath the needles, and the operator lays another section on the next arm while the first is being sewn. In the curved-needle machines, the

holes are made by piercers contained in the feed-arm. Each needle carries a thread, by a semi-rotary movement, downwards through one of the holes in the back of the section, and upwards and outwards through the adjacent hole. As the point of the needle emerges from the back of the section, it passes through a loop of thread held in position by a looper which resembles a crochet hook. The looper

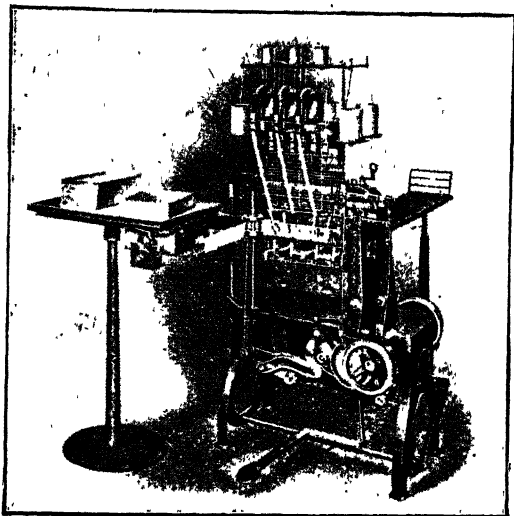


FIG. 12. NO. 3 "SMYTH" BOOK-SEWING MACHINE.

moves backwards and drops the loop, and then forwards, when it picks up the thread presented to it by the curved needle. As the needle retires, another loop is formed. The looper, by an ingenious series of to-and-fro movements made in conjunction with another take-up member and spring, takes up the loose thread and maintains the necessary tension to ensure a tightly-sewn book. The looper then comes to rest with the loop held ready for the needle when it emerges from the back of the next section.

The Improved No. 3 "Smyth" (Fig. 12), which is probably

the most extensively used book-sewing machine, takes from one to six needles in a single-needle block. It can be set up for various jobs in from five to ten minutes. In addition to plain or French sewing, this machine will sew through or over tapes, with or without braiding. The braiding thread



FIG. 13. BOOKS SEWN ON NO. 3 "SMYTH" BOOK-SEWING MACHINE.

is an auxiliary thread, which proceeds in a zigzag direction over the tape and connects the threads of alternate sections on each side of the tape.

The No. 4 "Smyth" is a popular sewing machine in those binderies which deal with miscellaneous work covering a wide range of sizes. It will sew sections from $2\frac{1}{2}$ inches to 18 inches in length on thin India to medium-weight account book paper. As each needle operates in an independent needle block, the stitches can be adjusted to meet exactly the requirements of the work to be sewn. Nos. 5 and 6 are similar machines, but of larger range: the No. 6 has ten needles, and is capable of sewing sections up to 25 inches in length, or up to 12 inches, two at a time.

The No. 12 "Smyth" (Fig. 14) is the latest model, with straight needles and a semi-automatic feed. The semi-automatic feed is made possible by the use of a stationary saddle, parallel to and at the right of the arm of the machine when this is in its lowest position. The section is fed to this

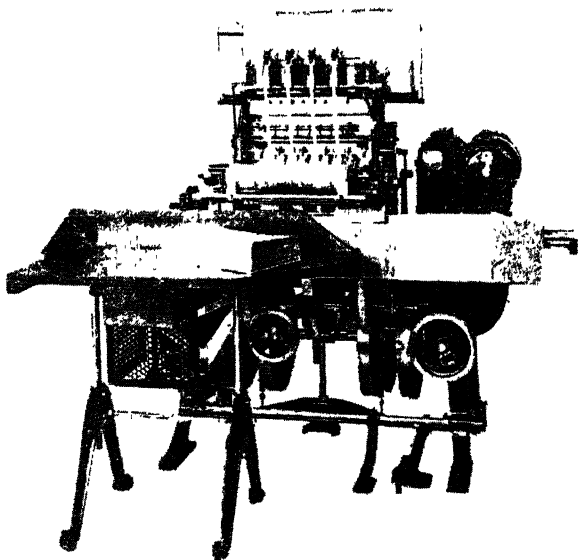


FIG. 14. NO. 12 "SMYTH" BOOK-SEWING MACHINE.

stationary saddle, and it is then conveyed to the feed-arm by a pusher which travels along a slot in the saddle. The arm then starts its upward motion, and the section is headed, levelled, and clamped while the arm is travelling to the sewing position. In this way, all the time taken by the machine to make one complete cycle is available for feeding, so that there can be a continuous speed of from seventy to seventy-five signatures a minute. An automatic pasting device is also fitted to this model above the feeding

arm. It is controlled by a separate foot-treadle and functions whenever the treadle is depressed, pasting any number of sections in a book at the speed at which the machine is

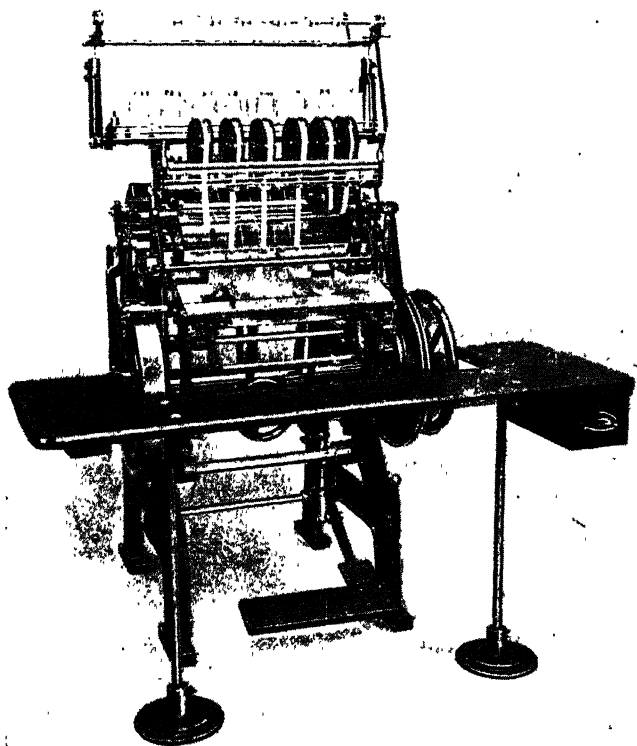


FIG. 15. "MARTINI" BOOK-SEWING MACHINE.

operated. This device in no way handicaps the operator in the feeding.

The "Martini" Straight-needle Sewing Machines are similar to the "Brehmer" machines, and are largely used in this

country because they are inexpensive and reliable. As there are no stitching heads on these machines, the stitches can be made very close together, and sewing on four tapes is possible on a book only 6 inches long. Models No. 1 and No. 2 are suitable for letterpress work. No. 2 uses up to six tapes and twelve stitches, and takes books up to 16 inch

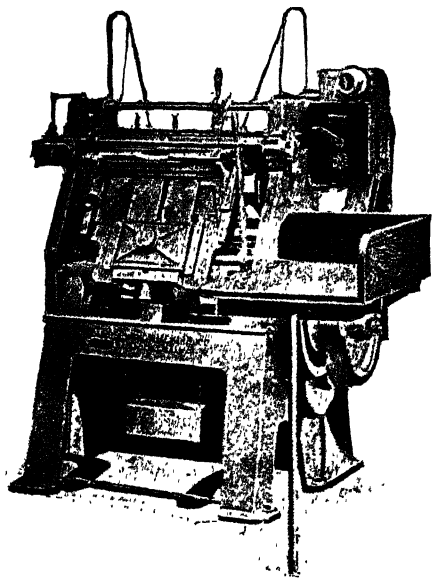


FIG. 16. OVERSEWING MACHINE.

in length. Both machines do plain French sewing as well as round and through tapes, and are capable of a speed of from fifty to sixty sections a minute.

The "Martini" No. 3 (Fig. 15) is a heavier machine, specially constructed for sewing account books. It takes books up to $22\frac{1}{2}$ inches long, will sew over tapes up to $1\frac{1}{4}$ inches wide, and has a maximum speed of fifty sections a minute.

OVERSEWING. An oversewing machine sews through the sides of the binding edges of the book sections instead of through the folds, and so ensures that each leaf is secured. During the last few years, this machine has supplanted the hand methods of whip-stitching, overcasting, and library



Courtesy Wm. Crosland, Ltd.

FIG. 17. ROLLER SCORING MACHINE.

sewing in most large binderies. The remarkable strength and durability of the oversewn book have caused many public and school libraries to specify this method for all their ordinary rebinding as well as for most of their periodical binding. Many publishers of textbooks also prefer oversewing. When a book is composed of single leaves, the back should first be glued and allowed to dry, and then it can be divided up into sections and oversewn. Very thin sections

may be sewn two or more at a time. The back of each section is drawn across the paster, and the section is then fed into the machine which, when the operating pedal is depressed, clamps, pierces, and sews it. When all the sections are sewn and the book is complete, the threads are cut and the book is removed. A good operator can oversee from

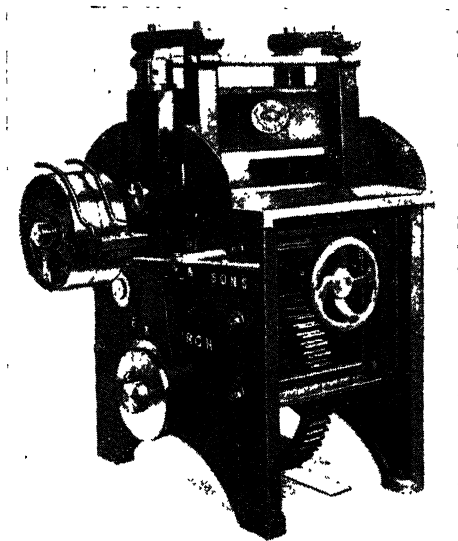


FIG. 18. THE GREIG "SMASHER."

300 to 400 average-size novels in an eight-hour working day, or, in other words, produce work equal to that of from five to ten hand sewers. Fig. 16 shows an oversewing machine.

The standard machine takes books up to $16\frac{1}{2}$ inches long and $4\frac{1}{2}$ inches thick, but a larger model known as the Newspaper Oversewing Machine, one of which is in operation in the British Museum bindery, takes books up to 30 inches long and $5\frac{1}{4}$ inches thick. The change-over from one size to another is effected simply by adding or taking away

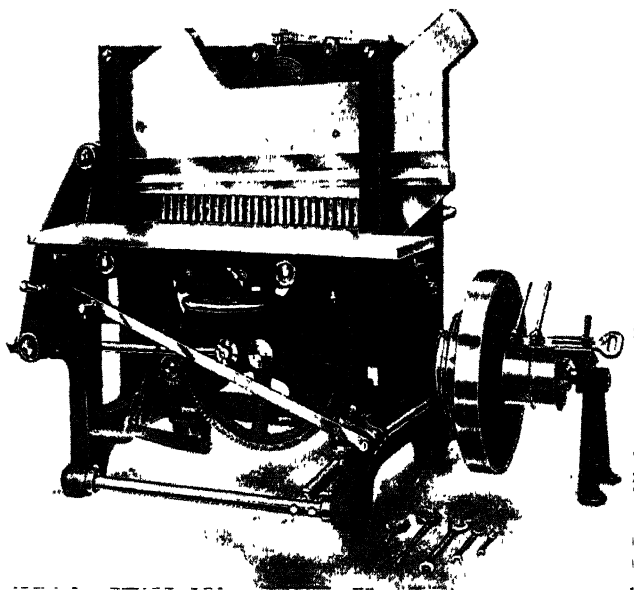
a number of the needles and punches, which a girl operator can do quite easily. The correct thickness of sections is very important in making a strong oversewn book. Thickness is determined chiefly by the nature of the paper. Books printed on stiff paper should have their sections scored or flexed in a scoring machine before they are oversewn, as the leaves will then open freely when the book is bound. A roller scoring machine is illustrated in Fig. 17.

SMASHING. When sewn, the books are made solid, and the swelling caused by sewing reduced by their being nipped in piles beneath the platen of a nipping machine or between the jaws of a book compressor. The whole surface is not usually nipped at once, but the pile is turned and nipped in several places until the books are solid. The machine must be regulated to dwell for a few moments upon the books in order that they may retain their solidity and be of the uniform thickness necessary in machine work. Fig. 18 shows a typical "smasher."

CHAPTER 3

CUTTING

CLAMPING, cutting, clamp releasing and stopping are entirely automatic on most modern single-knife guillotines. Most makes are now fitted with the shear-action knife



Courtesy Wm. Crosland, Ltd.

FIG. 19. "ADVANCE" SELF-CLAMP GUILLOTINE.

(see Fig. 19), which, beginning the cut at an angle, enters at one side of the paper, gradually straightens during the cut and becomes level by the time the cutting stick is reached. This side as well as dip-shear action ensures a clean, smooth cut. The back gauge on many machines is in three sections, so that three piles of books can be trimmed to different

dimensions at each stroke of the knife, or the fore-edge, tail and head of a pile can be trimmed without the setting of the back gauge being altered. On some machines, the automatic pressure of the clamp can be adjusted to suit the class of paper to be cut simply by turning a ratchet nut.

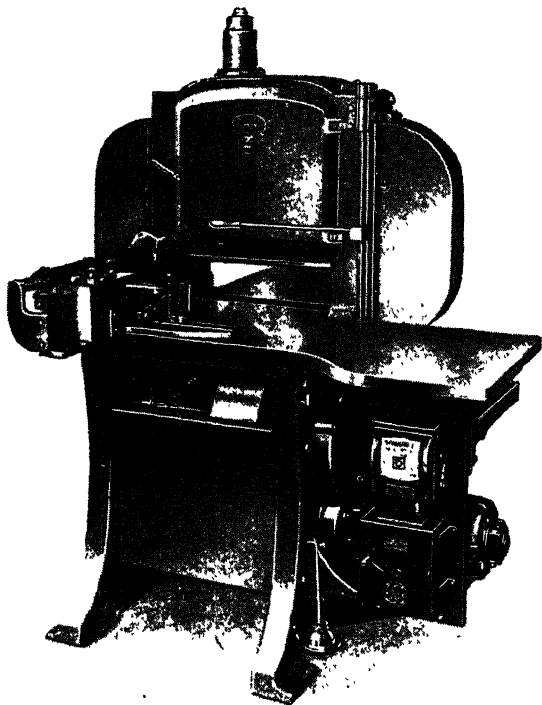


FIG. 20. MIEHLE "SAFETY" TRIMMER.

If the pressure is insufficient the top sheets will draw out when cutting. See also "Guillotine Cutting" in *Letterpress Bookbinding*.

Three-knife Book Trimmer. There are several reliable makes

of upright three-knife trimmers, but the "Seybold" (Fig. 22) is probably the most popular in England. This machine will trim books up to 24 inches in length, 16 inches in width, and in piles up to 6 inches in height, while the change-over from one size to another can be made very quickly. The automatic

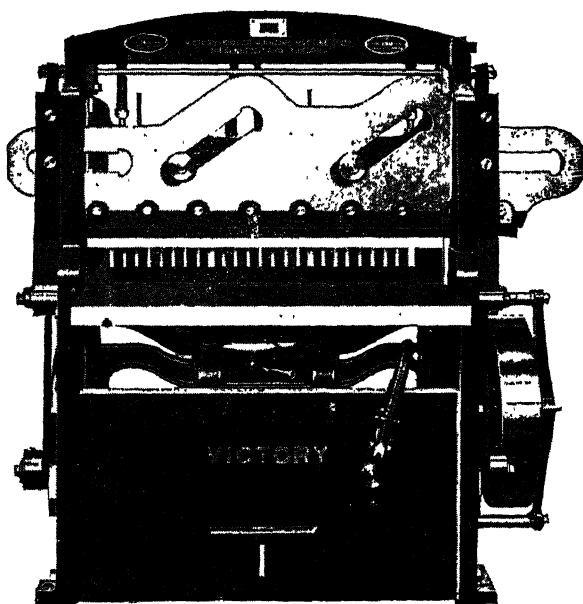


FIG. 21. "VICTORY" GUILLOTINE.

clamp has a flexible joint which allows for the extra thickness of the pile at the back, and the pressure may be regulated as desired. Pattern blocks of various sizes are made up from pieces of binder's board glued together to a thickness of $1\frac{1}{4}$ inches. If these are kept attached to separate clamp plates, only the back and head gauges need to be set and the rear knives and pressure column adjusted for the change



FIG. 22. "SEYBOLD" THREE-KNIFE TRIMMER IN OPERATION.

from one size to another. The pattern block should be about $\frac{1}{8}$ inch smaller each way than the books to be trimmed.

The three knives are arranged with one in front to trim the front edge of the pile and one on each side to trim the head and tail. When the starting-lever is pulled, a guard

descends to the table in front of the clamp and knives, and the operator must withdraw both hands. The clamp descends, compresses the pile of books, and applies the full amount of pressure required to hold them firmly in one position while all three sides are trimmed. The two side-knives then descend

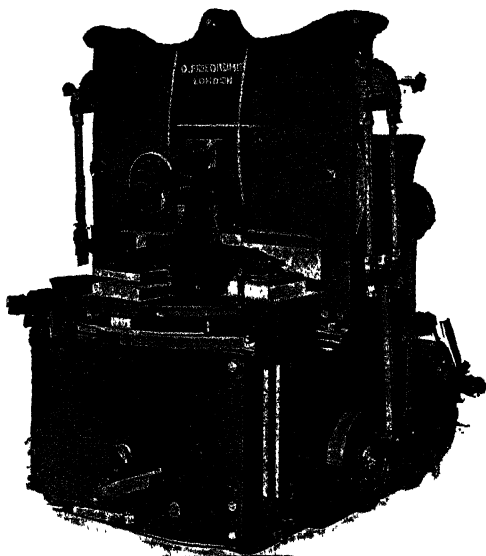


FIG. 23. "FRIEDHEIM" FOUR-PILE, THREE-SIDED GUILLOTINE.

simultaneously and trim the heads and tails of the books. When these have risen above the pile, the front knife descends and trims the front edge. When the front knife has returned, the clamp is released, the guard rises from the front table, and the trimmed books may be removed. The next pile is then placed in position against the back and side gauges. In three seconds after the starting-lever is pulled, the machine automatically completes the trimming of the three sides of the pile of books. Even with the highest class of work, such as books to be gilt-edged, an average

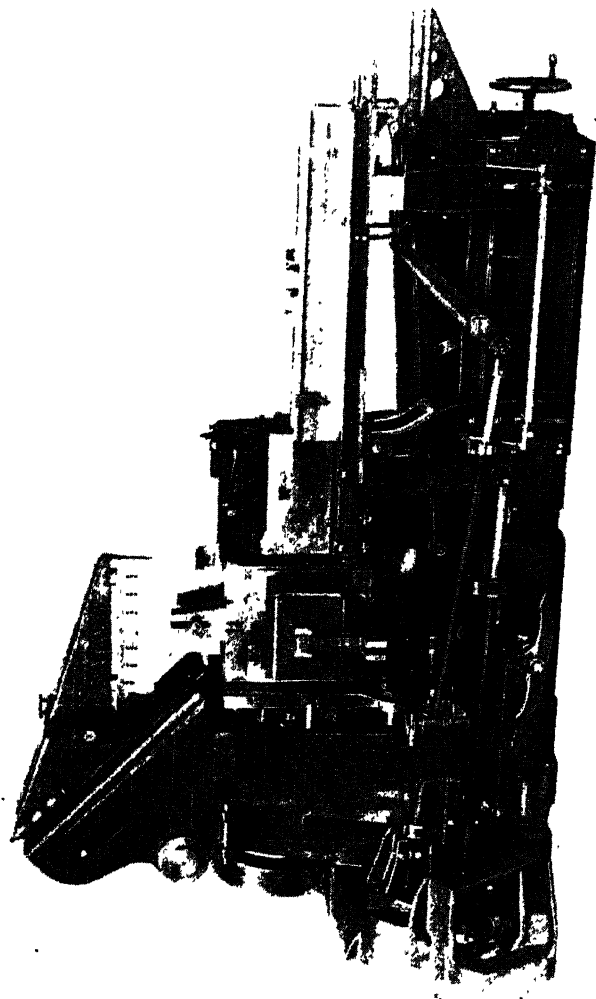


FIG. 24. "SEYBOLD" CONTINUOUS AUTOMATIC BOOK-TRIMMER.

output of 200 6-inch piles an hour has been obtained, and this rate includes the time required to change from one size to another. A special composition cutting-board is used in place of cutting-sticks on three-knife upright trimmers.

The "Friedheim" Four-pile, Three-sided Guillotine (Fig. 23) has an enormous output. It works at twelve cuts a minute, and 4 feet of books can be trimmed on all three sides in one minute. One operator only is required and one girl to take away the books, as on this machine no adjustment of the knives is necessary for the change from one size to another. The alteration is made by a movement of the feeding table in accordance with the indicators. The machine is arranged either to work continuously or to stop automatically after each cut.

Book Trimming Machines. In the "Seybold" Continuous Automatic Trimmer (Fig. 24), the books are placed in a trough with the backs downwards, and passed along to a square revolving block, which has four cutting beds; here they are automatically clamped. The first turn of the block brings the side holding the books to the top, where the first knife shears the front edge. The next turn brings the pile to the far side of the machine, where two knives shear the head and tail. The third turn brings the pile to the bottom, where the books are dropped on to a belt conveyor. This four-cycle, continuous movement makes possible a normal cutting-speed of 1,440 6-inch piles an hour; but this speed can be increased or reduced to suit the feeding. The ordinary operation of the machine requires only three people: one to place the untrimmed books in the trough, one to jog and feed them, and one to remove the trimmed books from the belt conveyor. The shavings are removed by a suction-blower. The machine as regularly built will trim all sizes from 4 inches by 6 inches to 12 inches by 16 inches. Sizes outside this range may be provided for by special construction.

The "Smyth" Book-trimming Machine (Fig. 25) is automatic except for the feeding. A bench of books 16 inches

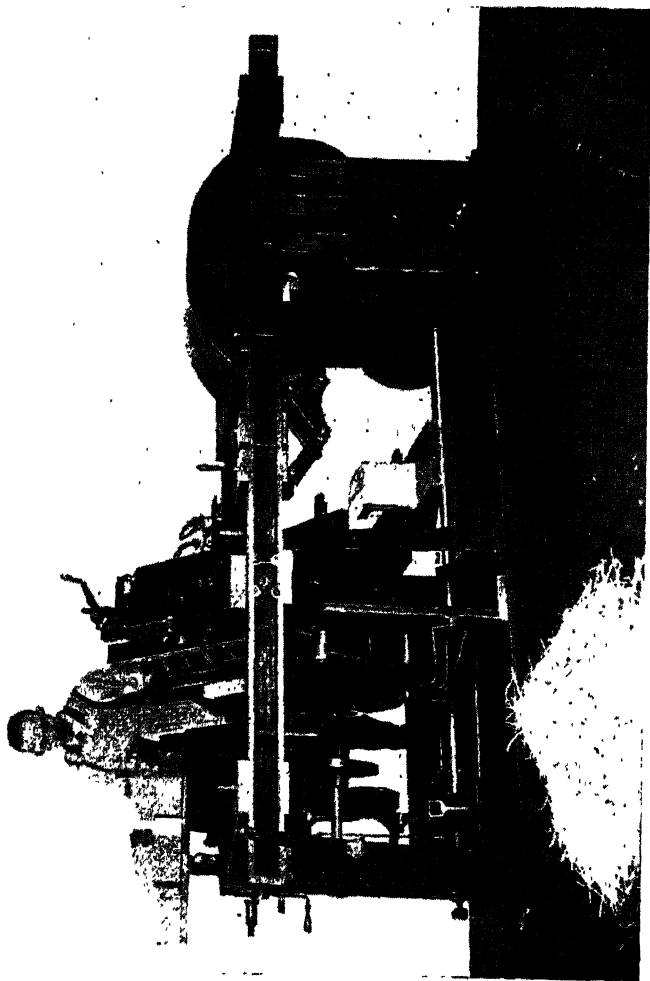


FIG. 25. "SMYTH" CONTINUOUS TRIMMER.

long is moved against the three knives during the cutting, and the operator need only place handfuls of books against a gate. The number of books in each handful must not exceed 4 inches in thickness. The gate is dropped automatically, the books are jogged, and then they join the bench of work already in the machine. The first knife shears the fore-edges, the books then move along to two other knives which shear the heads and tails. While they are being cut, the books are subjected to a pressure of from 3,000 to 4,000 lb. When the cutting is completed, a handful of trimmed books equal in thickness to that fed in by the operator is discharged into a receiving trough. The knives cut against uncut work only; no cutting sticks or board are required. This machine will trim 1,800 books 1 inch in thickness in an hour, running at its normal speed of fifteen cuts a minute. With thinner books, more can be fed in each handful and a corresponding increase in production is obtained. The makers claim that an experienced operator can make adjustments in changing from one size of work to another in from five to ten minutes. It is quite profitable, therefore, to put runs of 500 books on the machine. In many large binding houses, the cuttings and shavings are conveyed direct from the cutting machines to baling presses by means of suction pipes. This method not only saves labour and ensures tidiness, but to a large extent eliminates risk of fire.

CHAPTER 4

GLUING, BACKING AND LINING

THE "Smyth-Horne" Book-back Gluing Machine (Fig. 26) is probably the most widely used in this country. It is simple in construction and effective in use. The operator needs merely to take a handful of books and place them

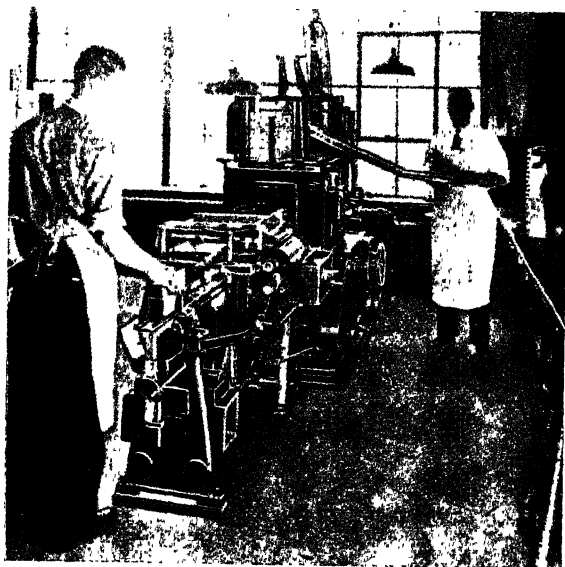


FIG. 26. "SMYTH" BOOK-BACK GLUING MACHINE
in combination with the "Smyth" Casing-in Machine.

backs downward on the feed-table. They are automatically conveyed over a gluing roller, which glues the backs, and then over a brush which brushes the glue well up between the sections. The glued handful is then removed by hand.

Books of any length over 4 inches and any thickness up to 4 inches can be glued on this machine. It is estimated that its output is equal to that of from three to five hand workers, thereby saving time and glue and ensuring cleanliness of work.

The "Friedheim" Back-gluing Machine (Fig. 27) consists of a water-tank, heated by steam, gas, or electricity, into which a glue tank is suspended by a spring balance. Three

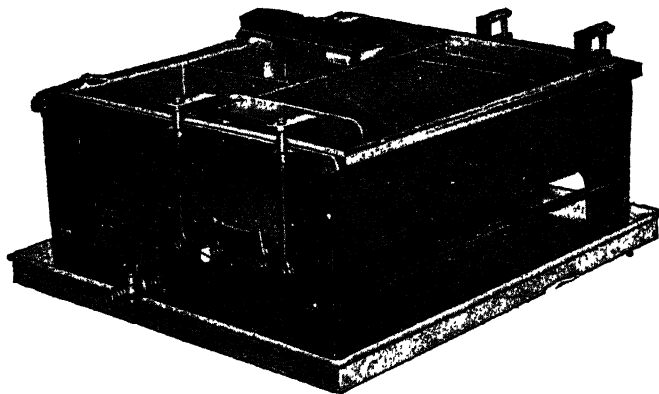


FIG. 27. "FRIEDHEIM" BOOK-BACK GLUING MACHINE.

separate compartments are provided: one with a perforated plate for the glue, one for the hot water, and one for the surplus glue, with a centre support which holds a stiff, flat brush. A pile of books is pressed back downward on the top of the perforated table; the glue then squirts on to the surface and between the sections. The pile is then swept over the brush once or twice and the surplus glue is removed. The small hot-water compartment provides hot water to maintain the correct strength of the glue.

ROUNDING AND BACKING. The "Crawley" Rounder and Backer has been in use for over fifty years, and is to be found in binderies all over the world. It is designed to

handle books that are to be flat-backed, rounded and backed, or rounded only. The standard machine takes books up to $12\frac{1}{4}$ inches by $10\frac{1}{2}$ inches from $\frac{1}{8}$ inch to $3\frac{3}{4}$ inches in thickness, and runs at a speed of from seven to eleven books



FIG. 28. "CRAWLEY" POWER ROUNDING AND BACKING MACHINE.
In operation.

a minute. The operator takes a book from a table on his left and with both hands places it between a pair of backing jaws in such a way that the required amount of back projects beyond them to form the grooves. The jaws clamp tightly upon the book, swing it backwards, and bring the back into contact with a concave backing plate, which oscillates as it presses on the sections, turns them over

evenly from the centre and forms the grooves. The book is then brought forward towards the operator, the jaws open, and the book is removed, another book having already been fed into the machine.

In the "Murray" Rounding and Jointing Machine (Fig. 29) the books are automatically fed from a hopper, one by one, by a convex former, which comes into contact with the

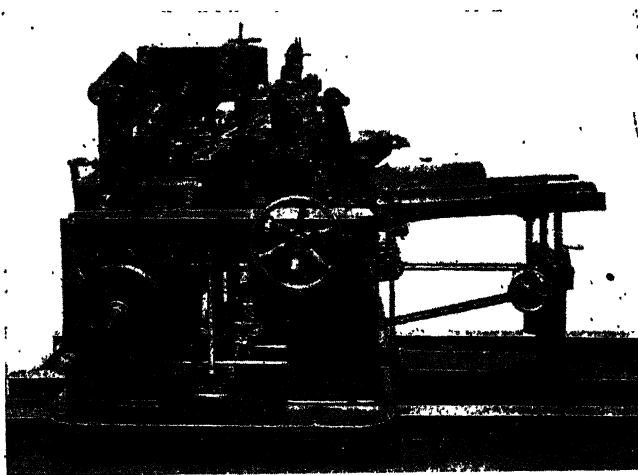


FIG. 29. "MURRAY" ROUNDING AND JOINTING MACHINE.
Showing hopper for automatic feeding.

fore-edge and thrusts the book upwards between the guides until the back is forced into a concave former which has the round desired. While in this position, the clamp closes on the book, the concave formers are withdrawn, and the jointing roller is lowered into contact with the centre of the rounded back of the book. By the usual centre-to-side movements, the roller compresses and moulds the back and forms the joints.

This machine can be operated independently, but it is more profitable to run it in combination with the "Murray"

First and Second Lining Machine (Fig. 32). In this way, all operations are combined into one series, which includes automatic feeding and comprises rounding and backing, automatic transfer to lining machine, first gluing, first lining, second gluing and second lining, and also a most effective method of rubbing down the paper lining into contact with the back of the book. This combination has a running speed

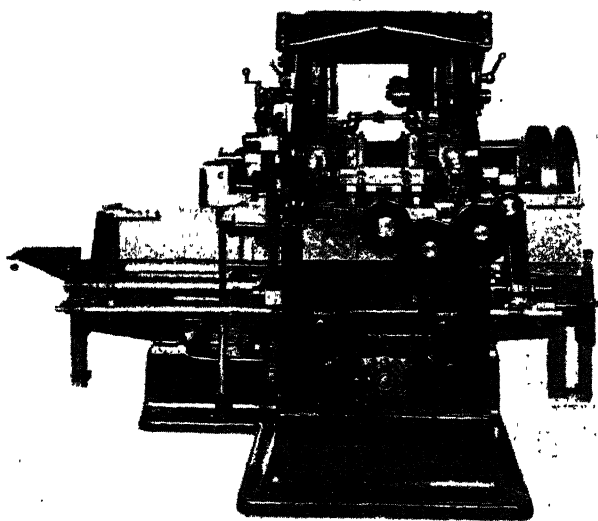


FIG. 30. "SMYTH" ROUNDING AND BACKING MACHINE.

of twenty-five books a minute, and only two operators are required. The standard machine is designed to take books up to 10 inches by 7 inches and up to 2 inches in thickness. The change-over from one size to another is effected in a few minutes.

The "Smyth" Rounding and Backing Machine (Fig. 30) is of the straight-line type with trough feed and trough delivery. The rounding is done with rollers and the backing with backing irons. Separate backing irons for round and

flat books are provided, and any desired amount of round and any sized joint can be obtained. All adjustments are provided with scales, so that the operator can work to an accurate figure. The machine is easily and quickly set up, all the adjustments being provided with hand wheels or cranks. The machine operates with practically no noise or vibration, and all exposed parts are guarded to ensure

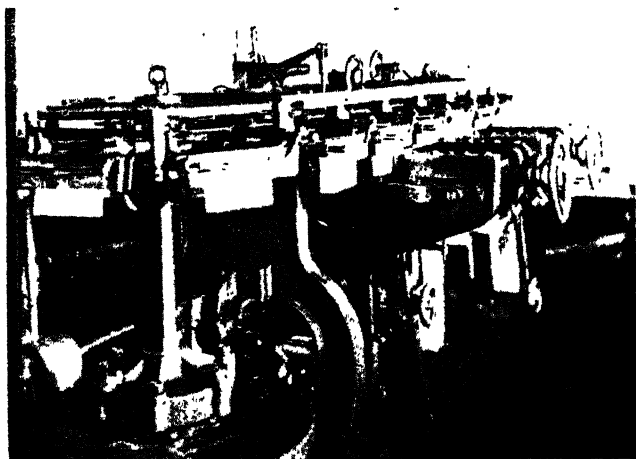


FIG. 31. "SHERIDAN" ROUNDER AND BACKER.

absolute safety. It is claimed that the machine will round and back up to a speed of thirty-six books a minute.

The "Sheridan" Rounder and Backer (Fig. 31) is an American machine which can be run either as a separate unit or in combination with the "Sheridan" Liner. These two machines run at a speed of thirty-five to forty books a minute, and have been designed for large firms which produce at least 15,000 books a day.

The Rounder and Backer is provided with a hand-feed trough into which is fed a flat-back book which has been glued up. The conveying chain carries the book forward

between the clamps to a shelf, where it is registered and squared against the inside clamp. Here also it receives the initial round. For the initial rounding, an overhead pusher pushes the book down against the former below the book. The clamp then closes and carries the book to the main former or roll-down station, where the book is pulled down to obtain the desired round. The rollers on each side, working together, squeeze the book, pull it down and accentuate the round, which is regulated by a hand-wheel adjustment. The clamps then carry the book to the next station, where a backing iron is passed over the back, giving the book a partial joint. It is then carried to the next station, the back is given the required pressure and the joint is completed. When the books are completely rounded and backed, they are carried forward to a delivery table and dropped there. They are then carried away by a continuous belt or else delivered directly, by means of a special connecting chute, to the infeed of the "Sheridan" Lining Machine.

LINING UP. The back linings of case books usually consist of a first lining of mull or crash and a second lining of brown paper. Mull should be cut so that the warp way—that is, the way of the roll, which often has double threads—goes *across* the back of the book. It should be cut a little shorter than the book and wide enough to extend for about $1\frac{1}{2}$ inches on each side. Brown-paper linings are cut in strips to the width and length of the back. When lined by hand, the backed books are piled up on the edge of a bench and the backs are brushed over with glue. A mull lining is then applied to each back, and the books are piled up as before. Glue is then brushed over the mulled backs and the second linings applied and well rubbed down. When the glue has set the books are ready for casing in.

In the "Murray" Back-lining Machine, when it is run independently, the books are fed with the fore-edges downwards into a channel the sides of which can be adjusted to

the thickness of the books. The books are conveyed step-wise through the channel to the various devices. At the first device, the book is clamped and receives a coating of glue from a rubber roller made specially to ensure effective gluing between the sections. The book is then released and conveyed to the scrim or mull device. As it enters, the book automatically starts this device, and the required length of mull is fed out from a roll, cross-cut, and seized by a pair of bars which draw the mull firmly and accurately into

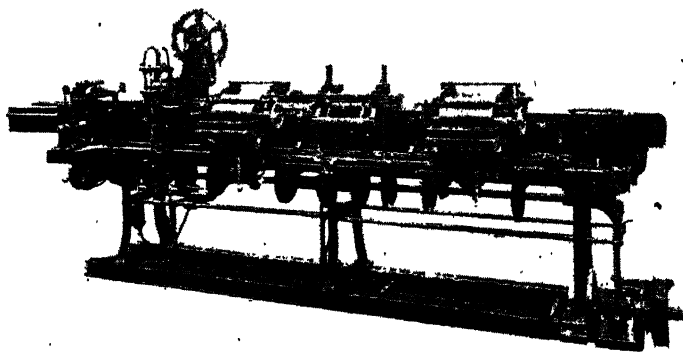


FIG. 32. "MURRAY" FIRST AND SECOND LINING MACHINE.

position on the glued back of the book. At the second gluing device, the mull is turned down and tucked round the joints by the clamp. The book then receives a second coat of glue on top of the mull, is then released, and moved on to the paper-lining device, which is automatically started as the book approaches.

The book-controlled action of the devices ensures that they do not start working until the books are presented to them; thus the machine can be run freely and the mull and paper linings need not be fed until they are required. When the book has put the paper-lining device into operation, paper lining of the required length and width is fed from

a roll. The lining is seized by a suction bar and cross-cut from the web. The bar then descends and places the lining in position on the back of the book, which is moved on to the next stage, where it is again clamped and a pneumatic roller makes a to-and-fro movement over the back. This roller is so inflated as to ensure sufficient pressure over the entire area of the curved back; this pressure ensures adhesion over the entire surface of the paper lining. The to-and-fro movement of the pneumatic roller is made during one-half of the machine cycle. During the other half, its surface runs in contact with a water-duct roller which removes any glue that may have adhered to it and charges its surface with moisture. The moisture is used for damping the paper lining of the next book. The "Murray" Liner handles books up to 7 inches by 10 inches, and works at an average speed of twenty-four books a minute. It is frequently used in conjunction with the "Crawley" Rounder and Backer.

The "Sheridan" Liner, which is often run in combination with the "Sheridan" Rounder and Backer, is suitable for only those binderies having a very large output. It is equipped with a hand-feed trough, into which the operator feeds the books after they have been rounded and backed. They are automatically advanced into clamps and carried backs downward over brass gluing rollers and over rolls of mull and brown paper, where the linings are cut and applied. Headbands, also fed from rolls, can be cut to size and fitted at head and tail if required. This machine takes books up to $12\frac{1}{2}$ inches by 10 inches, and works up to a speed of 2,000 books an hour.

The "Smyth" Lining-up and Headbanding Machine (Fig. 33) is a different type. The books pass through the machine side by side with a distance of only $2\frac{1}{2}$ inches between the centres. There is thus a saving of floor space, power, and mechanical complications. By this method also the operations are performed on the back of the book from end to end and in the following order: 1 glue, 2 mull, 3 glue, 4 mull, 5 glue, 6 headbands and back-lining paper, and

7 five rubbing-down stations. The feed is of the semi-automatic trough type, and the delivery is automatic, the books passing out of the machine on a chain conveyor. The amount of glue applied to the back of the book is accurately controlled by ductor rollers. The headbands and back-lining

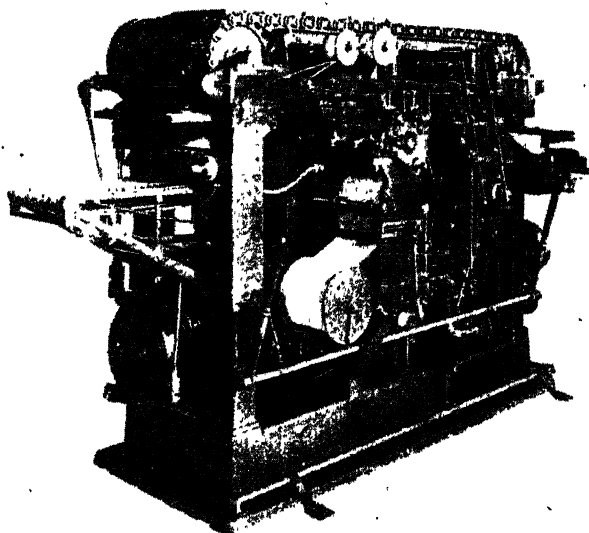


FIG. 33. "SMYTH" LINING-UP AND HEADBANDING MACHINE.

paper are applied ready assembled to the back of the book; this is probably the most positive and efficient way of handling them. Cotton, silk, and mercerized headbands may be used. Each station works automatically, functioning only when a book is fed. Any combination of stations may be used, so that books that require only one mull lining, or no headbands, pass through the machine without these materials. The machine operates smoothly and silently at a speed of thirty books a minute.

CHAPTER 5

CASE-MAKING

EXCEPT on very short runs, case-making is now done by machinery, but the operations remain the same as in hand work.

Case-making by Hand. Two strawboards of suitable thickness are cut to size for each book with the usual square

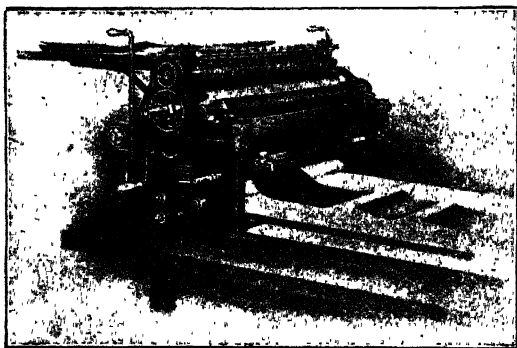
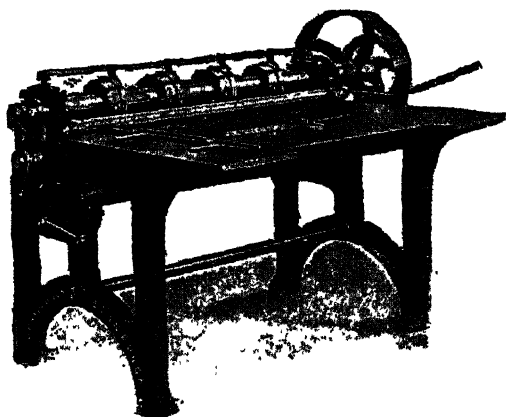


FIG. 34. "SMYTH" SHEET-GLUING MACHINE.

allowed for at head, tail, and fore-edge. A strip of stout paper, known as the hollow, is cut to the width of the back of the book and the length of the board. A cover is then cut out of cloth, or other material, sufficiently large to allow a turn-in on all four sides of $\frac{5}{8}$ inch. The cover is glued by hand or by machine (*see* Fig. 34), and the boards are laid in position upon it with the hollow between them. The four corners of the material are then cut off with the scissors, and the cover is turned in and well rubbed down with a folder.



Courtesy J. Greig and Sons

FIG. 35. HEAVY ROTARY MILLBOARD-CUTTING MACHINE.

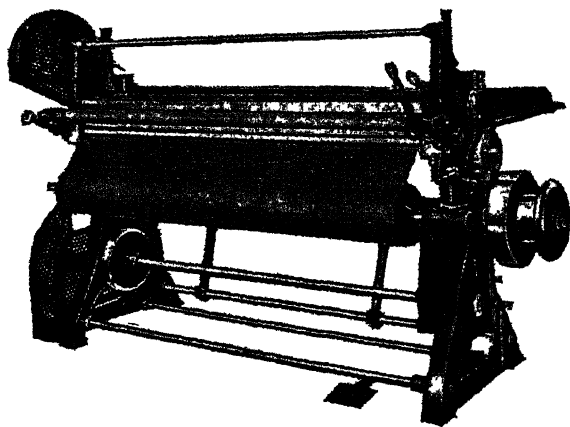


FIG. 36. "SMYTH" CLOTH CUTTER.

Rotary Board-cutters. In edition work, the boards are cut to size in power-driven, rotary board-cutters (see Fig. 35). These machines have two sets of adjustable circular steel cutters, the upper set of which work against the lower. The board is fed into the machine between two steel rollers that force it against the cutters. Another pair of rollers delivers the strips on the far side of the machine. The cutters are then reset, and the strips are cut into boards of the size required. An automatic feed is usually fitted when very long runs are handled. The "Stop-Gore" feeder works at three times the speed of a hand feeder.

Cloth-cutting Machines. The "Smyth" Cloth-cutting Machine (Fig. 36) is constructed to take the standard size rolls of bookbinder's cloth. When it is unwound from the roll, the cloth is first carried through a straightening device to remove the curl and then slit by rotary cutters into the desired widths. A cross knife then shears the slit portions into rectangular covers of the required size. The cross knife can be eliminated if required, and the entire roll of cloth can then be slit into portions of any width and rewound.

Case-making Machines. The "Smyth" Case-making Machine (Fig. 37) makes cases from cover paper, bookbinder's cloth, imitation leathers, and from genuine leather if it is of even thickness. It also works with plain or bevelled boards. The covers are cut to size and the four corners are cut off. The boards are placed in hoppers at the rear of the machine, and paper of suitable width for the hollows is also placed in position. The operator feeds the covers one by one to grippers on a cylinder; and the other operations are then automatic. The cylinder revolves and brings the reverse side of the cover material into contact with a roller which revolves in a tank of glue. The cover is then carried to a platform with the glued side uppermost. Suction lifters then pick up two boards and lay them in position upon the cover. The hollow is cut to correct length and laid in position between the boards. The platform descends and folding bars turn in the material at the head and tail, and

at the same time the corners are nicked in. The second folding bars then turn in the cover at the fore-edges. The case is next passed along to be pressed on a water bag, which gives even pressure to sides and back and preserves any grain in the material. The completed case is delivered and piled on an automatically descending delivery table fitted at the right side of the machine. The No. 1 machine

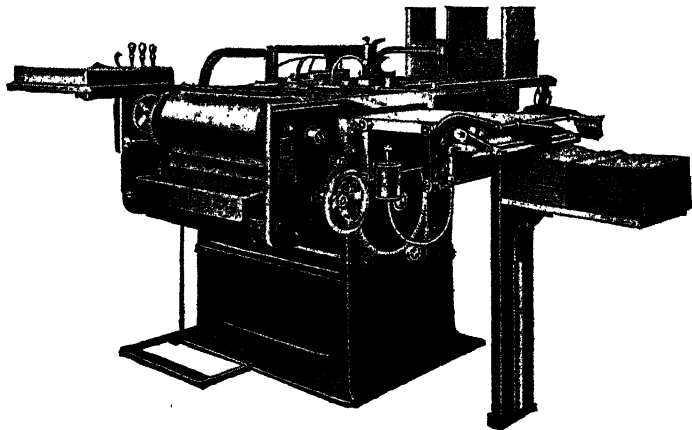


FIG. 37. NO. 2 "SMYTH" CASE-MAKING MACHINE.

makes cases up to $9\frac{1}{2}$ inches by $15\frac{1}{2}$ inches, and works at a speed of from sixteen to twenty cases a minute. The No. 2 is a larger model and makes cases up to 14 inches by 22 inches, working at a speed of from ten to twelve cases a minute.

The "Smyth" Automatic Case Machine retains all the advantages of the hand-fed models, and in addition increases production and eliminates spoilage. This model is especially valuable for the automatic electric control of every operation, by means of which the machine is instantly stopped if any of the materials are used up, are not delivered, or are not correctly assembled. The machine is also stopped if fed with seriously defective material. This control makes

constant supervision unnecessary, and a skilled operator can look after two machines, each with an average output of from 7,000 to 8,000 cases a day. The ease and speed with which all "Smyth" Case Machines can be changed over from one size to another makes them very economical for short runs. They are supplied with special attachments which enable the machines to make half- and quarter-bound cases and also cases with round corners.

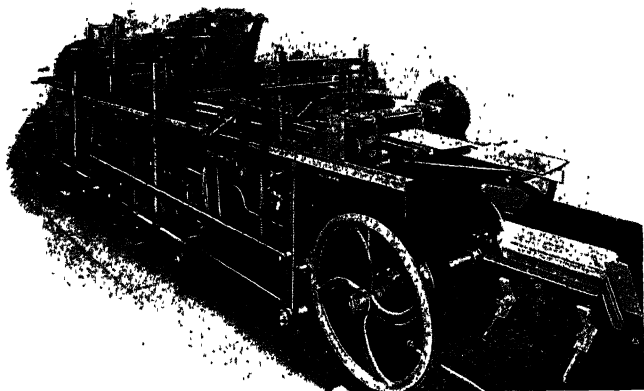


FIG. 38. "SHERIDAN" CASE-MAKER.

The "Sheridan" Case-maker (Figs. 38 and 39) is a machine of a different type. It has the enormous output of from thirty to forty-five cases a minute. The cloth, which is fed from a continuous roll, is slit to the required width and rewound on the special cloth slitter and rewinder supplied with each machine. The reel of cloth is then placed on a spindle at one end of the case-maker, and as it is unwound the reverse side is glued by being brought into contact with a glue roller fed from a tank. The supply of glue is controlled by the operator, and can be regulated to give a large or small flow. The boards are stacked in a feed hopper and fed in pairs at right angles to the web of the

glued cloth. Sufficient space is allowed between each pair of boards to give the necessary turn-in to each case when the cloth is cut. The boards are held in position as the cloth moves forward to the corner-cutting knives. These are two pairs of V-shaped knives which work one within the other as the cloth is fed between them. The upper knives pass down through the lower knives and cut a V-shaped piece from the cloth between each pair of boards.

The case is then brought beneath a roll of brown paper, from which the hollow is cut to the desired width by a movable, strip-cutting knife. A pneumatic device grips the

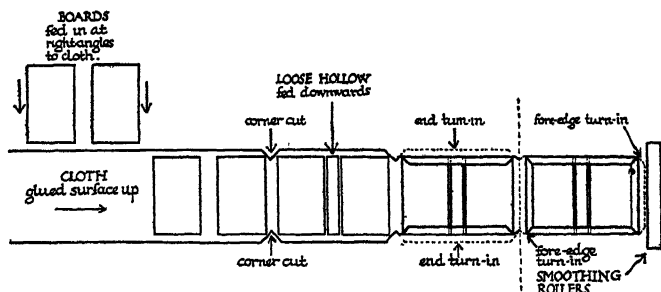


FIG. 39. DIAGRAM OF OPERATIONS OF THE "SHERIDAN" CASE-MAKER.

strip, holds it while it is cut, and releases it only when it is placed in position on the glued cloth exactly between the pairs of boards. Each case then passes to the first folding plate, where the cloth is turned in and pressed down at the head by one roller and at the tail by another.

The cloth and boards next pass forward under the cut-off knife, where they are registered against a gauge. The knife descends, passes through the centre of the V-shaped cuts on each side, and so cuts the cloth and separates the cases. A second pair of rollers then comes up from under the supporting plate and turns in the cloth along the two fore-edges. The case then passes between two smoothing rollers and is delivered.

The above description applies to the regular 25-inch model, which makes cases up to 16 inches by 25 inches, and also to the 14-inch model, which makes cases up to 9 inches by 14 inches. The 17-inch model has an end feed, and the case formation is switched round through 90 degrees. The boards are fed in pairs, parallel with the web of the cloth and not at right angles to it; the hollows are fed from a narrow roll which also runs parallel with the web of cloth. In the 17-inch model, the fore-edges of the case are turned in

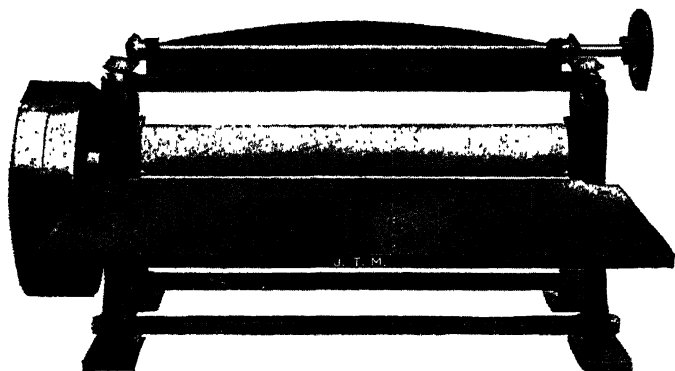


FIG. 40. "MARSHALL" CASE-STRAIGHTENING MACHINE.

first, and the head and tail last; otherwise the sequence of operations is the same as in the 14-inch and 25-inch models.

Case Straightening. Cases which become warped should be straightened before they are blocked. The blocking processes also may cause warping, and the cases should then be straightened again before they are passed to the casing-in machine. When automatic machines feed from a hopper, the cases must be perfectly straight or have a slight bend in the right direction. They should be passed through the rubber rollers of a machine such as the "Marshall" Case-straightening Machine (Fig. 40). By adjustment of the top roller, the cases can be delivered perfectly flat or with a slight bend in the direction required.

CHAPTER 6

BLOCKING

PUBLISHERS' cases are usually lettered and decorated by impressions from the raised surfaces of type and metal blocks, with ink, gold leaf or foil as the medium. The process is similar to hand-tooling, except that mechanical pressure

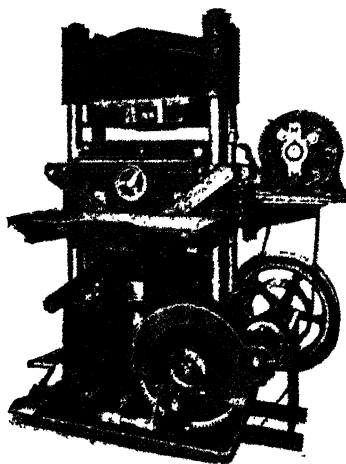


FIG. 41.

"SHERIDAN" 5AB BOOKBINDER'S PRESS.

is used. The type or block is fixed to the heating-box or platen of the blocking press and brought to the right temperature, a light impression of the block or type is pulled upon the case, and gold leaf is laid on. A second impression is then pulled, the surplus gold is cleared away, and the stamping is complete.

The Blocks. Brass is the most satisfactory metal for blocks and type, as they need to be heated and impressed fairly heavily on hard materials. Aluminium or electrotype plates, preferably nickel-faced, are used for those books which do not justify the cost of engraving brass blocks. The impression soon loses its sharpness when electrotype plates are used for stamping on cloth cases; therefore, several blocks should be made if the run is to exceed 500.

Preparing the Cases. Many cloth and imitation leather cases can be blocked without any preparation, as sufficient adhesive for the gold leaf is contained in the material. Experiment alone will determine this, but freshly-made cases are less likely to require preparation than those which have been made up for some time. Many imitation leather cloths have a surface finish that must be removed before the gold will stick. Cases made from these materials must have a preliminary wash with methylated spirit, benzine, or whatever the manufacturers recommend, before they are sized.

A single coat of diluted finishing size made from albumen, shellac, or Young's patent size should be sufficient for cases made of cloth, buckram, or imitation leather. Cases made with real leather need blinding-in and the same preparation as for hand-tooling. The coat of size should be applied with a soft sponge or wide camel-hair brush; the covers are then stood on edge to dry. To prevent frothing, a little milk should be added to the size, and the sponge or brush should be washed in clean water at frequent intervals. Blocking powder is used on rough calf, silk, paper, and other materials that cannot be sponge-sized. The case is dusted with the powder and the gold leaf is laid on the block, which is first lightly greased. The impressions obtained when powder is used are not so solid and permanent as those obtained on properly-prepared materials, and the powder method should be avoided wherever possible.

Fixing the Blocks. As most blocking presses take at least half an hour to heat, the gas should be lit or the current

switched on while the job is being made ready. Type lettering and type-high blocks are set up and imposed in a steel chase which is then fixed to the platen of the press. Binder's electros are usually about $\frac{3}{8}$ inch thick, and are mounted on an iron plate when in use. A sheet of stout brown paper is glued to the outer side of this mounting plate, which is then fastened to the platen of the press. A piece of brown paper

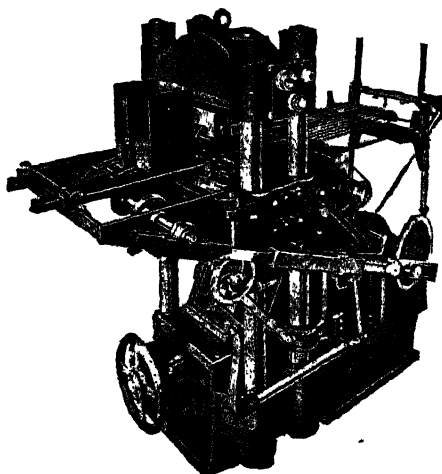


FIG. 42.

"STANDARD" AUTOMATIC BLOCKING PRESS.

is glued also to the back of the block and trimmed level with the edges.

A piece of strawboard is cut to the size of the case when open, and the position for the block is marked on it. The back of the block is then glued, and the block is laid face downwards upon the board in the position required. Board and block are then placed on the bed of the press and adjusted so that the board is square with the bed, with the centre of the block immediately under the centre of the

platen. This is necessary to ensure even pressure and impression and to avoid damage to the machine. The side and back gauges are then set and the bed brought up until the block is in firm contact with the warm platen-plate. After a few moments, the bed is lowered and the block is left glued tightly to the plate. The following method is used

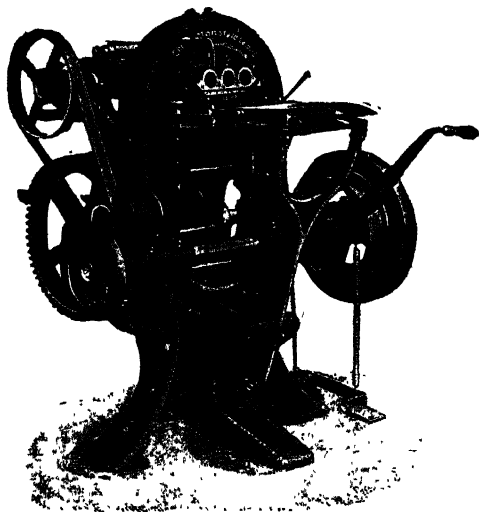


FIG. 43. "FRIEDHEIM" POWER BLOCKING PRESS.

when the pattern is built up from a number of small blocks $\frac{3}{8}$ inch high. The design is drawn out on a piece of millboard cut to the size of the cover. The blocks are glued at the back, and laid in position face downwards upon the pattern board. Board and blocks are then carefully placed in the press, the bed is brought up, and the blocks are fixed to the warm platen-plate.

Making Ready. A pull of the type or blocks is taken upon the millboard overlay which is glued to the bed of the press. The bed is then brought forward, and pieces of paper are

pasted over any weak places until all impressions are even. A final pull is then taken upon a piece of paper, and if this is found satisfactory the operator lays a case in position, adjusts the amount of machine impression, and proceeds with the blocking.

Laying-on. Genuine gold leaf is costly, and should be used with economy. When a large surface is to be blocked, it is advisable to run the cases through the press and give

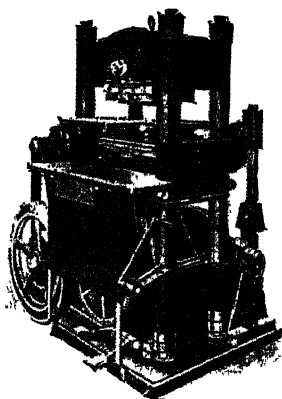


FIG. 44. "SHERIDAN" 3-A PRESS.

them a light blind impression before they are prepared. The gold leaf can then be cut and laid on the impressed portions of the cover only. When the cases have no preliminary blinding, a laying-on gauge is cut to the exact size of the case from a piece of very thin card or stout manilla paper. This card or manilla sheet is placed in the blocking press up to the lay gauges, and an impression of the blocks is pulled upon it. The stamped portions are then cut out, so that when the gauge is laid upon a case it leaves exposed only those surfaces over which the gold must be laid.

The cases are wiped over with an oily rag, and the gold leaf is laid on with a curved laying-on pad. A laying-on

wheel which uses paper-backed roll gold leaf up to $1\frac{1}{2}$ inches wide can be used where long strips are required. As the wheel runs along the case the leaf is transferred to the slightly-greased material and the paper backing is rewound.

Metal leaf is comparatively cheap, and economy is not so necessary as when gold leaf is used. The book of leaf is cut to the required size with shears, the leaf is laid on with the

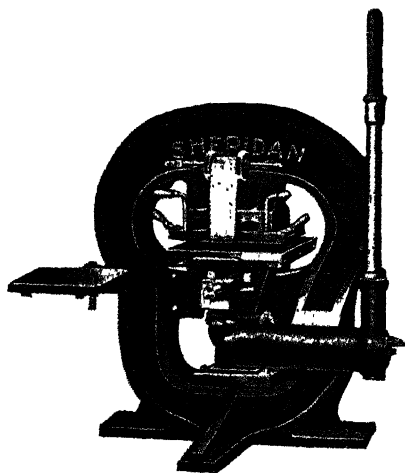


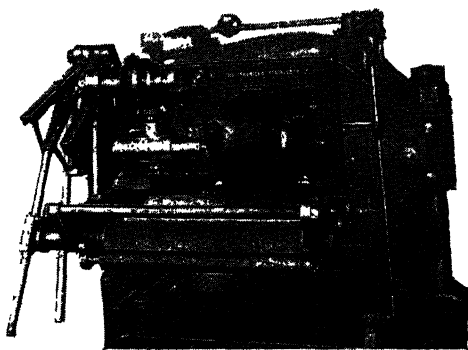
FIG. 45. "SHERIDAN" BENCH BLOCKING PRESS
with roll-leaf feed attachment.

fingers, and finally pressed to the cover with a pad of cotton wool. To save time in cleaning-off, metal leaf is frequently laid loosely upon the covers, which then are not greased. With this method special care must be taken to prevent the leaf moving out of place as the cover is put into the machine.

Heat. The degree of heat required for blocking varies with different materials. It also depends upon the length of time the cases have been made. As a general rule, the blocks should be cool for all varnished surfaces, at medium heat for genuine leather, and rather hotter for cloth materials.

When impressions are dull and lack sharpness, the blocks have been made too hot; when the gold is bright, yet does not stick properly, they are not hot enough.

Feeding. When the spine of a case is to be blocked, the surface must be brought level with the covers. To do this, a strip of board of the same thickness as the cover boards should be glued to the bed of the press. On power-driven presses the cases are fed in with the right hand and removed with the left. To facilitate the feeding, it is necessary for



Courtesy Sheridan Machinery Co., Ltd.

FIG 46.

"IDEAL" ROLL-LEAF FEEDING ATTACHMENT.

the cover slightly to overhang the edge of the bed. It is, therefore, often more economical to feed the cover twice, so that the front board and spine are stamped at the first feeding and the back board at the second.

Cleaning-off. The surplus of genuine gold leaf is wiped off with a gold rag or rubber, from which it can be recovered, but the surplus of metal leaf is of no value, and should be rubbed off with the hand or with a short-bristled brush.

Roll Leaf. The rather expensive method of laying gold leaf upon the covers by hand has now to some extent been superseded by the automatic roll-feed attachment (Figs. 46

and 47), which can be fitted to both hand and power presses. Gold and metal leaf, and coloured foils, are mounted upon paper backing and wound in rolls of various widths and up to 600 feet in length. Each roll is wound upon a hollow

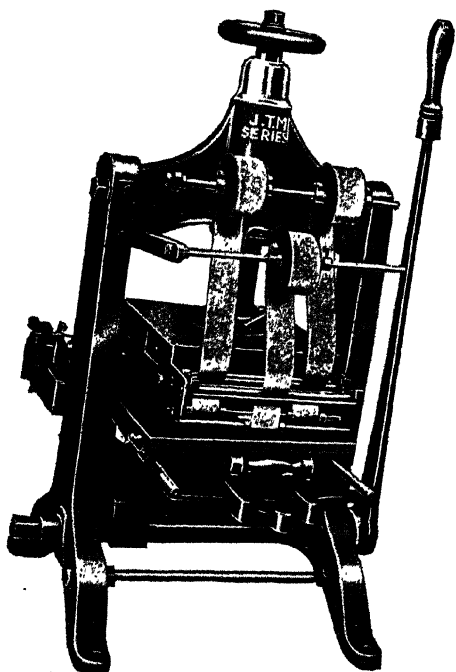


FIG. 47. "MARSHALL" BLOCKER
fitted with roll-leaf auto-feed attachment.

cardboard tube, which may be slipped over a spindle fitted at the front of the machine for this purpose. Leaf may be fed simultaneously from several rolls, each of which can feed, if desired, a different length of leaf according to the

size and position of the blocks. Several colours of leaf may also be stamped on different parts of the work at the same time. From the roll, the leaf is carried underneath the block to a pair of rollers at the back of the machine. These rollers are driven automatically by the action of the press. The extent of their movements and the consequent length of leaf drawn through is adjustable to a fraction of an inch. The gold is transferred to the case only in those places where the block comes in contact with the leaf. The used leaf, which is again reeled on the rewinding shaft, can be sent to the refiners, who recover the gold.

No previous sizing of the cover is necessary when the leaf is blocked from a roll, since there is a preparation on the surface. Time is saved in the laying-on, and very little cleaning-off is needed; a wipe with a soft rag removes any particles adhering to the impression.

! *Blind Blocking.* This is done simply by impressing the heated blocks directly upon the material. When only part of the design is to be in blind, this part should be blocked after the cases have been prepared and before the gold blocking.

Coloured Foils. Printing with inks upon materials with a rough surface is not satisfactory. White and light-coloured inks, particularly, give poor results, and a better method is to use the blocks at moderate heat and stamp with coloured foils. The covers are sized, and when they are dry the leaf is laid on loosely with a gold-knife. When the blocking is completed, the surplus leaf is wiped away with a soft brush. This method gives solid results. A coloured ground for printing can also be obtained in this way.

Ink Blocking. Most power blocking presses are fitted with an attachment for blocking with ink. In this process the press is not heated, but the blocks are rolled with composition rollers as in a printing press, and specially quick-drying bookbinder's ink is used. The ink, obtainable in various colours, is of a thicker consistency than that used by printers. It is frequently necessary to make a blind

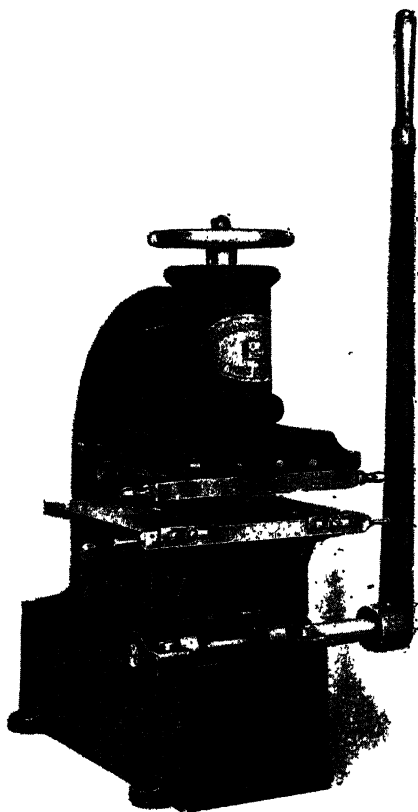


FIG. 48. "HARRILD" BLOCKING PRESS, NO. 6.

impression on the cases before the actual printing, and on many materials two impressions with ink are often required to obtain good solid results. Specially built heavy platen presses are also used to print and emboss publishers' covers. A good imitation of gold blocking for cheap work is obtained with a gold ink paste printed in a platen or small rotary

press. Here, however, the blocks must be heated to dry the ink and give a solid impression. The covers require no sizing or cleaning-off, and the results obtained by this gold printing method compare favourably with imitation-gold blocking.

Blocking Presses. There are many makes and sizes of blocking presses for both power and hand operation, the nature of the work and the length of the run being the deciding factors. The "Harrild" Blocking Press No. 6 (Fig. 48) is a hand lever press particularly suitable for miscellaneous work. Because it has open sides, larger jobs can be blocked on the corners and edges than are possible on many other small machines.

The Standard Fully Automatic Press is an American blocking and embossing press that has an automatic case feed, and is capable of speeds of from twenty-five to thirty cases a minute. It can be used for ink stamping or for gold and imitation-gold blocking from the roll. Over a hundred cases can be placed in the hopper from which they are automatically fed into the centre of the press, where they are stamped in blind or with ink or in gold and then automatically delivered and piled uniformly on a lowering table. A water-cooling device enables this machine to change over quickly from gold-blocking to inking.

Some of the more important machines, which are made in a wide range of sizes to suit all classes of work, are the Seybold, Krause, Chandler and Price, Marshall, Sheridan, Friedheim, Beatrice, and Harrild presses, some of which are illustrated on pp. 215-222.

Air-brush *superfinishing* of cases is now general practice in most large binderies.

CHAPTER 7

CASING-IN

Back Forming. After the case is blocked, the back must be rounded to conform with the shape of the book being covered. To obtain this rounding, the back of the case is passed over a heated pipe of the right shape or the cases are run through a back-forming machine. Back-forming mechanism is included in the "Murray" Casing-in Machine and also in the latest model Smyth (see Fig. 26). When these machines are used, no previous rounding of the cases is required.

The "Smyth" Back-forming Machine is entirely automatic. The covers are fed from a hopper, whence they travel along an electrically heated forming bar which gives the correct form to the back. At the same time creasers put a sharply defined crease or joint in the back. The ironing process, which the covers undergo as they travel the length of the former, greatly improves the appearance and feel of the finished book. The formers are made a yard in length to ensure that each case receives sufficient heat to form it perfectly. The cases are delivered from the machine into a long box, where they stack up evenly without damage to the backs. The speed of this machine is from forty to seventy cases a minute, according to size.

Casing-in. Casing-in is the process by which the book is fastened to its covers. When casing-in is done by hand, the back endpaper is lightly pasted and the book turned over and placed in position upon the cover. The front endpaper is then pasted and the front cover drawn over on to it. The squares are adjusted, and the book is nipped in the press.

The "Murray" Casing-in Machine (Figs. 49 and 50) can be used separately or linked up with the rounder and

backer and liner previously described, when it becomes the third unit of the "Murray" Continuous Forwarding Machine.

The book to be cased passes on its fore-edge into a bell-mouthed guide, which supports it. It is then pushed forward on to the knife-edge of the book blade, the point of which enters the leaves without damaging them. An automatic pusher places the book in its approximate position on the blade, and the final adjustment is made by a second and

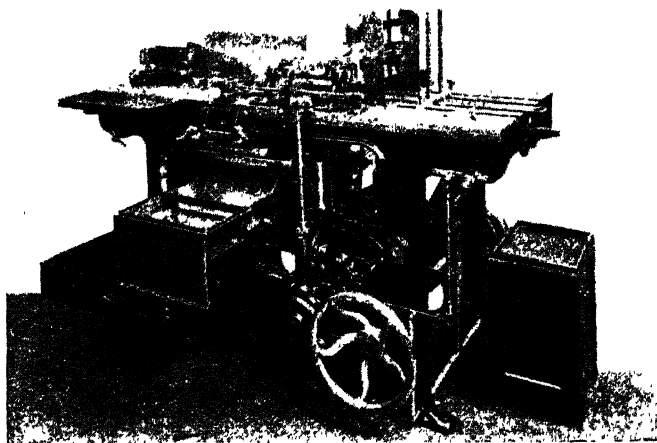


FIG. 49. "MURRAY" CASING-IN MACHINE.

auxiliary pusher. The book blade and book then descend and paste is applied on each side of the book by a rubber roller which has a hollow groove along the entire length. This hollow is arranged to carry the amount of paste required for the book, and is mechanically adjusted so that the edge of the groove makes its first contact with the book at the edge of the joint. As the roller rotates, this edge turns in below the joint and applies the paste directly to the surface. The book is brought upwards, the rubber roller on

each side pastes the remainder of the endpaper, and at the same time a case is withdrawn from the hopper at the rear of the machine and brought over an electrically-heated former which rounds and forms the back. The rounded case is then held in position over the pasted book, which rises into it, the covers are closed upon the endpapers, and the

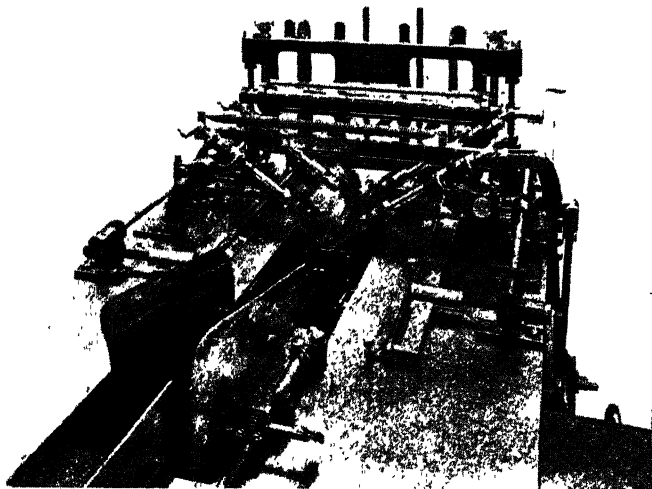


FIG. 50. CASE ROUNDING AND FORMING MECHANISM OF THE
"MURRAY" CASING-IN MACHINE.

book is delivered for pressing. The firmness of books cased-in on this machine is due to the ingeniously designed pasting rollers, by means of which an adjustable quantity of extra paste is applied to the joints and over the mull. The rubber pasting roller picks up its supply of paste from a gunmetal supply roller, which in turn is fed from the duct roller in the paste tank. The diagram (Fig. 51) shows the method by which the quantities of paste are controlled. *R1* are the rubber pasting rollers, *R2* the gunmetal supply rollers, and *R3* the duct rollers. If the space between *R2* and *R3* is

larger than the space between $R1$ and $R2$, a quantity of paste accumulates at A , and is distributed over that portion of the roller which comes into contact with the joint and mull strip. By means of these adjustments the paste can be applied to the joints, the mull, and the endpapers in the exact quantities required just as when casing-in is done by

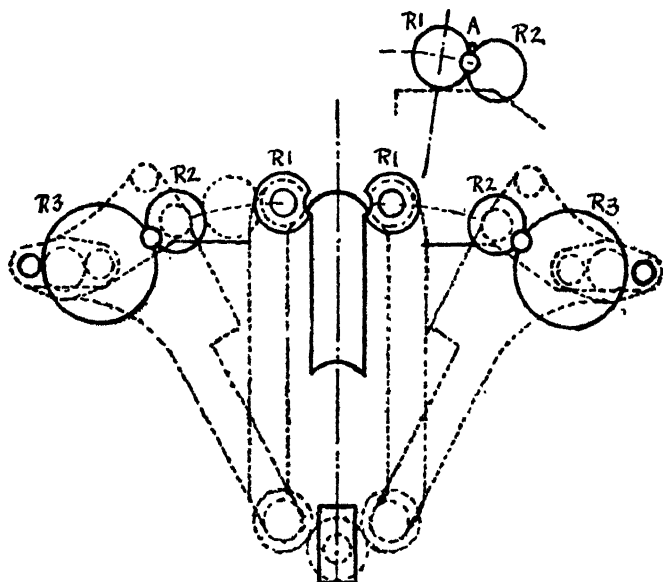


FIG. 51. PASTING DEVICE OF THE "MURRAY" CASING-IN MACHINE.

hand. This machine, like the other units, is designed to work at a speed of twenty-five books a minute.

The "Smyth" Casing-in Machine (Fig. 52) has three radial feed arms, each of which has a book-supporting plate attached. The operator opens the book as near the middle as possible and places it over one of these plates and up to a gauge. A third of a revolution brings the book over the centre of the machine. It is then lowered and an even film

of paste is applied to the endpapers by knurled rollers, which can be adjusted to supply the amount of paste required for the type of book being cased-in. Extra paste is applied at the joints to provide for the tapes and mull. As the book begins to rise, a case is brought from a hopper at the rear of the machine and held directly over the book.

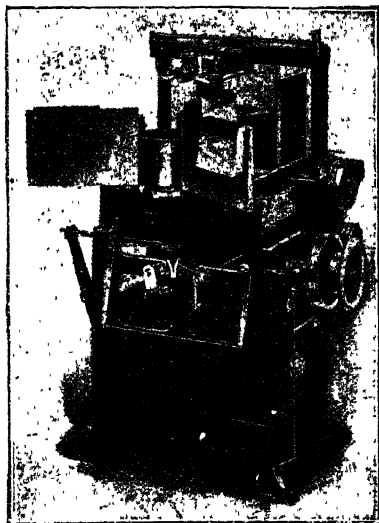


FIG. 52. "SMYTH" CASING-IN MACHINE.

The cover is then forced firmly over the book by clamps, which also set the joints and press the sides of the cover to the sides of the book. The arm makes another third of a revolution, bringing the book clear of the machine for removal. In this way one book is fed while a second is cased and a third is delivered. The speed of the machine is from fifteen to twenty books a minute.

The new style "Smyth" Casing-in machine (Fig. 53) is, like the "Murray," of the straight-line type—that is, the work proceeds through the machine without reversing its

direction. The books are fed past a latch into a trough, from which they are carried automatically over a splitter and on to a saddle, where they are headed. Blades are attached to a continuous chain, which moves at intervals; these come up through the saddle, lift the book from it,

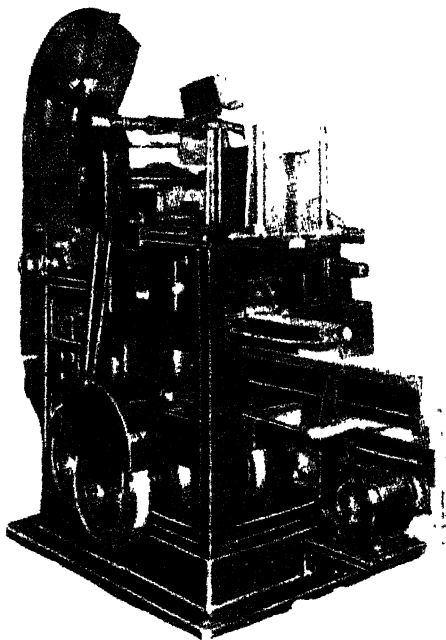


FIG. 53. NEW STYLE "SMYTH" CASING-IN MACHINE.

and carry it between paste rollers. While passing from the saddle to the pasting position, the book is automatically levelled on the blade. Before being pasted, each book is stationary for a moment to allow the paste rollers to come into the correct position at the joint of the book. A case is automatically fed from a hopper, brought over a heated former to give the back the correct shape and joints, and then held directly over the pasted book which rises to



FIG. 54. HYDRAULIC PRESSES:

meet it. Book and cover then move upwards, passing through rollers, which press them firmly together. The book is removed from the blade by a pair of jaws equipped with strips which nip the cover well into the joints. The book is then delivered back-downwards into a discharging chute.

If the operator fails to feed a book, the case-feed mechanism automatically disengages, and automatically engages again when a book is fed. This control ensures that a case is fed only when a book is in position to receive it. This machine works at a speed of thirty books a minute.

Pressing. After being cased-in, books require pressing. Powerful hydraulic presses (*see* Fig. 54) are used in edition work. The books are built in between pressing-boards, and a strip of brass or aluminium (which is usually fitted to the edges of the wooden pressing-boards) sets the joints of the books. A heavy board with a notch at each end is placed at the top and bottom of the pile. When sufficient pressure has been applied, iron rods are inserted in the notches and the pile is locked up by means of hand-wheels. It can then be removed on a truck and stored under pressure for any length of time. This method greatly reduces the number of presses required. When removed from between the boards, the books are examined and the dust wrappers or jackets are placed round the covers. This final operation is usually done by hand. The Pathé Book Jacketer is a new American machine which operates at 1000 books an hour.

